

Report of a Workshop on the Future of Observatories in the Social Sciences

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* Katharine Abraham was called to serve in the Council of Economic Advisers in Feb. 2011. This new set of obligations prevented her working on drafting this final report. She did, however, contribute to early drafts of the report. Her place as co-author of this report was taken up by Barbara Entwisle and Charlie Brown who were participants in the Workshop.

Executive Summary

This is a report on a Workshop held at the National Science Foundation Dec. 16-17, 2010, attended by 23 leading scientists from social, behavioral and economic (SBE) disciplines. The goal of the workshop was to consider ways in which major new NSF investments in a system of observatories might benefit and potentially transform these fields. This report summarizes the deliberations that occurred during the workshop and recommends next steps.

Workshop participants agreed that critical questions vital to the future of the nation should drive any major investment in infrastructure. Accordingly, they identified five clusters of cross-cutting questions that highlight the transformative SBE science that could be carried out by a network of observatories. In terms of topic area, these are: Children, Education and Our Future; Rebuilding the Middle Class; Changing Social Networks; Sustainable Cities; and the Resilience and Vulnerability of Socioecological Systems. While these five categories of questions should not limit the scope of the proposed observatories, they were viewed as grand themes of interest to SBE and the nation, and which would benefit from the kind of infrastructure discussed therein.

Much of the workshop focused on a review and discussion of models from a range of disciplines, with specific reference to their potential for addressing questions and issues critical to SBE science. Particular attention was given to the Long-Term Ecological Research Stations (LTERs) and investments that might be made to build up their social science components. Many other possibilities were also considered. In the end, there was most enthusiasm for a hybrid—part observatory, part laboratory, part thematic center, and part data synthesis center. Observatories based on this model would be geographically distributed across the nation in order to provide a set of nodes to collect primary survey, ethnographic, and experimental data as well as mining pre-existing local and regional data sources and making these various data sources available to the social science community. Ensuring data privacy and confidentiality and data security will be a major interest of these centers with use of new disclosure control methodologies and privacy-preserving data mining methods. A major focus would be data integration, including linkage of diverse units over space and time. The vision was of a network of observatories designed from the ground up, growing organically from one or a small number of pilots to a geographically distributed system with core data collection on one or more of the five broad questions but with flexibility in expanding the data collection depending on local/regional issues of particular concern or urgency to local stakeholders and the science community.

Workshop participants recommended that NSF encourage a follow-up workshop to develop a plan for the network of observatories, with particular attention to the design of a fully fleshed-out set of centers, and an initial call for proposals focused on a pilot or set of pilots to inform this overall design.

For the pilot, the call for proposals should identify as minimum requirements a core of new place-based data collection at local to regional scale and cyberinfrastructure, data archiving, synthesis, analysis and distribution. Undergraduate and graduate training and community engagement are highly desirable components. Each of the pilot Centers should be subject to an initial process evaluation after three years, to ensure that planned efforts have been successfully launched, with a more substantive evaluation of accomplishments after five years. One important yardstick will be at how well the pilot centers are moving towards brokering new data sets, and making new data available to the SBE community (particularly commercial and administrative data).

Experience with the pilots will inform the SBE Directorate as to whether investments in additional Centers are warranted or whether it is wiser to acquire additional experience with the original pilots before making that decision. Sustainability is critical. Many if not most of the potential benefits of the proposed Centers will be realized only over a period of many years and initial investments could to a large extent be wasted if successfully-operating Centers were not given the means to continue their work over that time scale.

Full Report

1. Introduction and Driving Questions

This is a report on a Workshop held at the National Science Foundation Dec. 16-17, 2010, attended by 23 leading scientists from a variety of social, behavioral and economic (SBE) disciplines. The goal of the workshop was to consider ways in which major new NSF investments in a system of observatories might benefit and potentially transform the human sciences.

This Workshop followed and built upon previous workshops addressing the need for cyberinfrastructure in social science research held in 2005, 2007, and 2009. The first two workshops (NSF 2005, 2007) described and documented a lack of the awareness, preparedness and capacity needed for the social, behavioral, and economic science community to collect, organize, and manage the broad array of regularly and irregularly collected social, economic and political data. Further, the funding needed to respond systematically to existing, emerging, or novel needs had not been provided to date. The third workshop discussed and evaluated the implications of the tendency for the current cyberinfrastructure for the individual SBE sciences to focus separately on the construction, dissemination, and analysis of data rather than taking a more wholistic approach (Groves and MacWhinney, 2009). There is a need for an integrative approach to cyberinfrastructure that could link psychological, genetic, linguistic, political, social, economic, geographical, cultural and neurological data at the level of the individual and local communities. By making it possible to address new questions, this approach could greatly advance SBE science. Groves and MacWhinney summed up the third workshop saying: "... significant breakthroughs could be possible if the SBE sciences jumped up to the larger scale of integration for cyberdata embodied in the proposed synthesis." (Groves and MacWhinney, 2009:2).

The Workshop on the Future of Observatories in the Social Sciences, convened in December 16-17, 2010 took the recommendations of the third workshop as its starting point in considering the transformative potential of place-based research. The objectives set for Workshop participants included a clearer articulation of the questions a network of social observatories might fruitfully address and how a network of social observatories might best be designed for such new research to flourish.

Questions

The natural starting point for any discussion of new investments in SBE Science is to consider the sorts of questions that would be at the core of the agenda. Consistent with most concepts of observatory, particular attention was given to the potential of place-based research. There are several possible reasons why a local rather than a

national approach to data collection and analysis might be appropriate. In some instances, the examination of complex and dynamic processes requires richer and more detailed information about individuals and the context in which they live than can be collected through a national survey. In other cases, the need to develop trusting relationships with local stakeholders in order to truly understand the local context or to secure local participation in data collection efforts, access to administrative data or cooperation in policy experiments may necessitate a local approach. Further, the formation of local research teams focused on local questions may be an especially good way to foster multidisciplinary collaborations and integration across the SBE disciplines. Workshop participants proposed a number of broad research questions as potentially best addressed through a place-based approach.

While it should be emphasized that the questions that follow are intended only to be illustrative, some examples of topic areas that could be addressed through a set of regional observatories might include the following:

1. Children, Education and Our Future: What works in childhood intervention? What works in childhood education? What makes a school effective? What determines the investments parents make in their children's educations? What works with respect to educating less advantaged students? How do schools, families, peers, and individual students interact to produce cognitive and non-cognitive skills? How do we increase participation in American society from an early age and through the life course? Many believe that social processes matter critically for all of these things—the decision to go to college and more generally the level of educational investments by students, for example, have been shown to depend on how peers behave.
2. Rebuilding the Middle Class: How can Americans living in poverty move to the middle class? How can we reverse the recent decline of the middle class and reduce the growing gap between rich and poor in America? Why are some people healthier, wealthier, wiser, more resilient, and happier than others? What social, economic, cultural and political processes contribute to this inequality? What can be done to make it possible for older people who would like to keep working to continue to do so? How are people in different regions of the country dealing with these challenges? How might we address these regional differences in middle class membership?
3. Changing Social Networks: How are social networks constructed and how are they changing? These structures are critical to resource flows, the spread of information and patterns of influence large and small. How are major features of social networks related to social inequality, and how do the circumstances and behavior of social and economic groups reinforce those differences? How do networks change over the life course? How do social networks embed themselves in geographic space? What kinds of places do they link, and what places do they not link? Social networks have radically changed our conceptions of space, linking people with apparently little regard for distance. The geography

of social networks is largely unknown and may differ from the familiar geography of planimetric maps.

4. Sustainable Cities: What does it take to develop a sustainable city? How do cities differ in how they move people and resources? What impact do legacy effects have on what can be done to restructure cities to be more sustainable? How can transportation and infrastructure facilitate this transition? Are there critical thresholds outside of which sustainability becomes less possible? How are different ethnic, social, age, and economic groups affected by efforts to build sustainable cities?
5. Resilience and Vulnerability of Socioecological Systems: What are the drivers affecting social (and ecological) system resilience? How can we increase system resilience within a community, institution, household, region? What factors (e.g., social networks, connectivity etc.) increase social resilience in a system? How can social science help society decrease its vulnerability, increase its resilience, and ultimately become more sustainable in the face of any kind of socioeconomic or environmental perturbation? How can we mitigate the impact of global environmental change as manifested locally and regionally, on individuals, neighborhoods, communities?

Place-based studies can help us better understand social inequality and disadvantage. By allowing us to examine the on-the-ground processes that affect individuals' health, economic, and psychological well-being, place-based studies can add to our understanding of individual and community outcomes. Local context includes the organization of neighborhoods, distribution and quality of schools, medical clinics and hospitals, employment opportunities, and informal but established patterns of social interaction. It is important, for example, for us to understand how individuals learn about opportunities and the options available to them, how they evaluate different options, what the rules are about how to get resources (e.g., who can get food stamps). The combination of ethnographic, experimental, and survey data, perhaps augmented with linked administrative data, can inform answers about the many aspects of individual well-being and sources of inequality, but by themselves these data cannot show us how individuals interpret or apply rules about access to program benefits, schools, and so on, etc., or the social interactions through which information and values are communicated. A local study also may enable more efficient collection of high quality data on individual outcomes.

The above questions were viewed by Workshop participants as both timely and important for SBE sciences and for the nation—and thus worthy of becoming cross-cutting driving questions that a network of social observatories could address. Our vision is that this network of observatories would be designed from the ground up to provide national representation, grow organically from pilots to a geographically distributed system with basic core data collection on broad questions such as the five above, but with flexibility in expanding the data collection depending on local/regional issues of particular concern or urgency to local stakeholders, the nation, and the science community.

2. The Notion of Observatories

The notion of building “observatories” has a long history in the physical sciences. Indeed, the very word brings to mind astronomical observatories. Telescope arrays and associated instrumentation are expensive, require large investments in infrastructure and presume and get their maximum benefit out of long-term commitment to observation. In the 20th century, more and more scientists have seen benefits in building observatories to understand physical processes such as carbon dioxide fluxes and to extend the sophistication of what used to be simple weather stations measuring temperature, precipitation and evaporation rates. Long-term observations matter when we want to understand processes over time and space, thus, they matter to social, economic and behavioral sciences and society as well.

Social science observatories would differ in important ways from those designed for the natural sciences and yet provide important foundational observations about social, economic, and behavioral elements of human activity to advance qualitative, quantitative, and transformative science. For some social scientists, large ongoing national surveys such as the Panel Study of Income Dynamics, the National Election Studies, and the General Social Survey have served and will continue to serve as a sort of observatory, although there are challenges associated with dramatically rising field costs and diminishing response rates. Despite the great value of these national surveys, as well as major contributions each has made to the social sciences, there are important dimensions of human behavior that these surveys are poorly suited to capture. By themselves, they provide only partial answers to the cross-cutting questions articulated above.

The Workshop considered the development of a place-based network of social observatories as a complement to the major survey programs. Two pre-existing examples or models were discussed: thematic observatories and place-based socio-ecological observatories. While both of these models are discussed in this report, Workshop participants came to consensus that a third type of hybrid observatory best served the SBE community and held the greatest promise for fostering truly transformative social science research. Thus, the report focuses primarily on what this hybrid observatory might look like—part observatory, part laboratory, part thematic center, and part data collection and synthesis center.

Large-Scale National Surveys

One can think of the large **national longitudinal surveys** as one sort of “observatory.” These surveys tend to involve regularly scheduled waves of data collection that are focused primarily on a limited set of issues. Eleven of 17 surveys reviewed by Abraham and Nixon (2010) are long-term panel studies, meaning that the same individuals or families are interviewed across multiple waves of data collection that may cover many years; the remaining six are repeated cross-

sectional surveys or rotating panel surveys that follow given individuals or households for a short time before they are replaced. In the case of the Panel Study of Income Dynamics (PSID), the longitudinal nature of the survey goes beyond following individuals over time to following whole families over time. As children have become adults they have been added to the study sample, permitting intergenerational analyses. The National Longitudinal Survey of Youth (NLS 1999) also has expanded its longitudinal dimension, as the children of women in the original cohort have been added to the study sample, and the NLSY 1997 includes large numbers of sibling pairs.

Each of the large national surveys has a special emphasis – e.g., income and wealth in the PSID; health in the National Health Interview Survey (NHIS); labor force activity in the Current Population Survey (CPS); social attitudes in the General Social Survey (GSS); or voting behavior in the American National Election Studies (ANES). To illustrate, while the PSID is fairly broad in scope, its concern with respondents' labor market experiences has led to the inclusion of questions about the starting and ending dates of jobs, characteristics of pension plans in which respondents participate, work schedules, job duties and responsibilities, attitudes towards the job, whether the job is covered by collective bargaining, reasons for changing jobs or job status, and basic question about hours worked, earnings, occupation, and industry. The survey questionnaire also includes questions about health, but these are more general and have changed over time. Conversely, the NHIS goes into great detail on health related topics, but asks less detailed questions about labor market activity than the PSID.

While survey designers might like to collect detailed information from respondents on each of a broad range of topics, the burden associated with answering survey questions limits the feasible length of a survey questionnaire. In practice, household surveys typically collect relatively rich information on the topics of primary interest to the survey sponsor and sparser information on other topics. This feature of survey data is a potential impediment to cross-cutting and interdisciplinary research, although creative linkages between surveys and external data such as administrative records, geographic coverages, and even other surveys has helped to address this limitation (Entwisle 2007). A possible motivation for establishing a network of social observatories as a complement to the existing set of national household surveys thus might be to compile more comprehensive information about people than can be collected from respondents to a national survey questionnaire.

Although national in scope, the existing household surveys have a geographic dimension, in that it is possible to link information about the areas in which respondents reside to the individual survey records. Indeed, many personal interview surveys begin with a sample design that includes geographically based clusters (primary sampling units), which can make these linkages to external data quite efficient. Examples of local information potentially available for linking include characteristics of the respondent's neighborhood from the Census or

American Community Survey, characteristics of the local schools, voting patterns in the state or precinct, land use patterns in the surrounding area, local levels of various air pollutants or relevant provisions of state and local laws (Abraham and Nixon 2010). Linking this sort of information can add value to the national survey data, but not all aspects of the geographic context can be captured by links to existing place-based data. The need for richer, more individually-centered and dynamic contextual information thus may be another motivation for establishing a network of social observatories to complement the existing national household surveys.

The growing costs of traditional household surveys are a third reason for exploring alternative models for social science research. The growing difficulty of obtaining household survey responses and the increased costs this has imposed on survey operations are well-recognized by survey researchers (see, for example, Abraham and Nixon 2010; Weisberg 2005). Drawing on administrative or other data collected for non-statistical purposes to complement or potentially even replace the direct collection of certain data is an appealing option and a network of social observatories might be one vehicle for moving in this direction. There could be a division of labor between the observatories in figuring out how to capture, make useable, and link different kinds of local data. For example, one group could specialize in school enrollment statistics, and another on credit card transactions. Each group, moreover, would specialize in information specific to their location, such as local crime statistics.

National surveys have provided valuable data to the social sciences and the nation. They provide a standardized, consistent, and rigorous sampling of the national population and the data produced have been of particular service to many branches of economics, sociology and political science, supporting research on trends in inequality, the effects of early experiences on later educational and labor market outcomes, marriage and divorce, and the determinants of electoral outcomes, among many other topics. On the other hand, many questions of interest to other branches of the social sciences such as behavioral economics, social psychology (and most of psychology), geography, anthropology, some branches of political science interested in subnational processes, and an array of interdisciplinary enterprises cannot be fully addressed using national survey data. Scholars in these areas need richer information about interactions among individuals, observations on how behavior evolves over time or more fine-grained contextual data, as well as very different research designs, to address many questions important to society. The primary focus of the Workshop was on how a network of place-based observatories might help to meet a broad set of these needs.

Thematic Observatories

One possible model for a place-based network of observatories would be to establish a network of **thematic observatories**. A thematic observatory is a center

where researchers from multiple disciplines and perspectives organize around specific themes and issues.

An example of a thematic center is the Center for the Study of Institutions, Population and Environmental Change (CIPEC) at Indiana University. Originally supported as a NSF-funded center to advance research on the human dimensions of global change, using as a focus explaining processes of change in forest environments as mediated by institutional arrangements, demographic factors, and other major human driving forces, it has developed its research across the Americas, at 50 sites in 12 countries (Moran and Ostrom 2005). Research on these questions has brought together anthropologists, geographers, political scientists, sociologists, economists, as well as physical and biological scientists. Existing thematic centers on poverty, on urbanization, and on land tenure, to give but a few examples, provide other models of thematic centers that address specific themes.

What might a *network* of thematic centers look like? The NICHD-funded population centers provide one example (see <http://www.nichd.nih.gov/about/org/cpr/>). There are at present 17 NICHD-funded population centers located across the country. Each center has identified specific areas of focus within the larger field of demography and each addresses regional, national, and international topics within those “signature themes.” Similarly, there are 14 NIA-funded centers whose purpose is to foster research in the demography, economics and epidemiology of aging and as well as to promote use of important datasets in the field (see <http://agingcenters.org/>).

It is possible that appropriately-structured thematic centers could serve as vehicles for further advances in the social sciences, perhaps organizing around the core agenda identified earlier. As already noted, there is growing interest in the statistical uses of administrative data. There is also interest in the social science applications of new sorts of social network data (e.g., Twitter feeds). One could imagine a set of thematic centers, each with the mission of compiling, documenting, and disseminating a broad array of administrative and other non-survey data in a particular topic area. This mission could include working with the managers of the large national surveys to link relevant non-survey data to their survey observations. While an intriguing idea this is not an option that was much discussed during the Workshop because it was not viewed as likely to result in transformative and significantly different approaches to future-oriented SBE science. The discussion focused instead on the other two models.

Place-based Socio-Ecological Observatories

A second model for a network of observatories that received greater attention at the Workshop is what might be termed **place-based socio-ecological observatories** that would build on and add needed social dimensions to existing networks of physical observatories focused primarily on biological and ecological questions. One of the questions posed to Workshop participants was whether it would make sense

to proceed by attaching social observatories to these existing biological and environmental observatories. This might be an attractive approach for research focused on sustainability and the resilience and vulnerability of socio-ecological systems, two of the themes identified earlier as potential areas for the observatories to address. Particular attention was given to the Long-Term Ecological Research stations (LTERs) as a potential vehicle for this purpose.

Biological stations wherein the dynamics of species, particularly trees, could be monitored through regular sampling have their origins in the early 20th century. The Michigan Biological Station and Duke Forest are examples of long-standing forest plots that have given biological scientists a rich appreciation of changes in structure and function of forest ecosystems over time (ca 100 years). Biology and ecology began to move in the direction of more ambitious data collecting efforts in the 1960's with the International Biological Program (IBP). In the 1970's, a network of long-term ecological research stations (LTERs) that would provide a more complete understanding of ecosystem structure and function was proposed. This approach, sometimes known as "Big Ecology," represented a significant departure from the smaller-scale work that was then more typical in ecology (Coleman, 2010). The four initial LTERs were built on pre-existing observatories that had been developed during the 1960's as part of the IBP, each representing a distinct eco-system (e.g., coniferous forest ecosystems at the Andrews site at Oregon State University). By 1980, six pilots had been established. In 1982, after a call for proposals, five additional sites were funded, and an additional five sites were added in 1987. By the early 2000s, there were a total of 26 LTERs (now 25, as one was cancelled in Spring 2010). The current complement includes two urban LTERs, one at Baltimore and another at Phoenix, that have an explicit focus on human-dominated ecosystems.

Interest in the incorporation of socioeconomic studies within the LTER network has increased over time. The funding of the two urban or human-dominated ecosystem LTERs gave further impetus to this interest. This new focus has been strongly influenced by a set of hypotheses positing that human activities fundamentally alter biogeochemical cycles and that in turn processes such as climate change can be expected to alter the decisions of human communities (Gragson and Grove 2006; Grimm et al. 2008). More LTERs now include some socioeconomic components, but social scientists remain poorly represented relative to physical scientists at the LTER sites – they are outnumbered 6:1 in the most engaged LTER site and by 20:1 in the less engaged sites. As a related point, research at the LTER sites has not had much of an impact on the parent social, behavioral, or economic sciences.

The LTER network continues to operate, and in addition, several new physical science observatory initiatives also are being established. The National Ecological Observatory Network (NEON) focuses on land use and climate variability across the continental United States; the Ocean Interactive Observatory Networks (ORION) focuses on oceanic research; and Water and Environmental Research Systems (WATERS) focuses on human stressed aquatic systems. The vision articulated for NEON is that it will help scientists to understand and forecast the impacts of climate

change, land use change, and invasive species on continental-scale ecology by providing consistent methodologies and infrastructure to support research and education in these areas. The questions to be addressed include concerns about climate change and land use impacts, invasive species, biodiversity, biogeochemistry, eco-hydrology, and disease ecology (Crutzen and Steffen 2003; Coleman 2010:153). NEON will be a nation-wide observing platform or a “network of networks”, leveraging existing research facilities and cyberinfrastructure such as those already in place in the LTER network, while adding new technologies and capabilities. LTER scientists are seen as the most likely users of the new infrastructure to be put in place. Site observations are intended to provide the raw material for continental estimates.

NEON is at present designed exclusively as a biological observatory. Although other data could be added, the only “human” data currently being incorporated are LANDSAT imagery and data from the agricultural (every 5 years) and population (every 10 years) censuses. Even if more ambitious efforts were made to incorporate existing “human” data from other sources, mismatch between the temporal and spatial resolution of these data vis-à-vis all the biological and physical science data compiled in NEON’s 20 domains would remain an impediment to understanding the interaction between people and environment. There has been more systematic integration of socioenvironmental research at a few LTER sites and one can envision that investments in socioenvironmental observatories at those sites could advance research on human-environment interactions. Neither the NEON nor the LTER network has been designed with these questions as drivers, however, and most of the sites in these networks are located away from population centers. This is a key point. Study locations were chosen in relation to a set of questions and concerns that did not include the human dimension. Even with an expansion in focus, these networks may not provide an ideal foundation for pursuing a human-oriented science research agenda.

With a different emphasis and design, human-environment observatories could generate better social and environmental science data at larger scales and over longer time frames. Documents such as the Integrative Science for Society and the Environment (ISSE) from LTER, the NEON Integrated Science and Education Plan (ISEP), and the NSF Coupled Natural Human Systems (CNH) program all highlight the areas where such integrative data could support transformative new research, including studies of social and ecological vulnerability and resilience in response to abrupt and long-term change, decision-making under uncertainty, and the value of ecosystem services, among many others. An example of this type of research is the study of human and ecosystem vulnerability to extreme weather events that can inform responses to flood, drought, storms and other disasters. Social science activities in support of research in this area could include household surveys, focus group interviews on individuals’ and groups’ perceptions, evaluations of their awareness of related threats, and valuation of the relative costs of different response scenarios (Vajjhala et al. 2007:13). Human-environment observatories that incorporate human behaviors in their analyses could inform policy makers about

resource allocation, influence the structure of markets and transactions, and promote public health and environmental conservation. The two urban LTERs and the ULTRA program provide examples of centers which include social and ecological work in equal measure.

There was a great deal of discussion during the Workshop about the idea of appending social observatories to existing biological observatories, such as the LTERs. Given some of the issues already noted – the dominance of biological and environmental scientists in the evolution of these centers and the fact that the sites for these existing observatories were not chosen with socioenvironmental questions in mind – participants were divided on whether this should be recommended. That said, the LTER community is eager for social science research on environmentally-significant questions. The general consensus seemed to be that one or two pilots might be supported to test whether this existing infrastructure of biological observatories could be harnessed to advance SBE science. Participants were considerably more enthusiastic, however, about the idea of a set of place-based centers or observatories that could begin to address the broader concerns of SBE sciences.

Hybrid Observatories

The third type of observatory discussed at the Workshop is what might be termed a **place-based hybrid observatory combining dimensions of regional synthesis centers, observatories, laboratories, thematic centers, and data centers**. Observatories based on this model would be geographically distributed across the nation in order to provide a set of nodes that could collect primary data in their region to provide rich contextual detail, as well as mining pre-existing local and regional data sources and making these various data sources available to the social science community. This sort of place-based observatory would seek to contribute to advancing the SBE sciences by following places and perhaps also people over time.

A central role for the place-based observatories would be to compile data and information and make that data and information broadly available to the social science research community. A good deal of the discussion at the Workshop and thus the focus of the rest of this report concerns the considerations of what such hybrid observatories might look like, what types of data and information it might be possible for a network of centers to collect and assemble and what services they can give SBE sciences and society at large.

3. Place-based Regional SBE Synthesis Centers: Choosing the Sites and Defining Their Roles

A topic that engendered considerable discussion during the Workshop was how the network of social observatories would be structured and developed. One major question was how the observatory sites might be selected. Factors proposed as

relevant included geographic coverage, observatory theme, and presence of existing infrastructure on which the social observatories could be developed. There was discussion about how many observatory sites were ultimately desirable, whether they should be selected to be nationally representative, and as a related point, whether the collection of sites should accrue from successful pilots or be selected *a priori*. Workshop participants agreed that however social observatories are developed, it is important to begin with proof of concept pilots. The Workshop did not have adequate time to fully flesh out what these pilots and observatories should look like, and our first recommendation is to have a follow up Workshop focusing solely on fleshing out the details of what a call for applications for such observatories should include and details of the expectations we should have on how they would advance and transform SBE sciences.

Some workshop participants argued for a relatively small set of sites that should be collectively diverse. This small-sample design—small from the perspective of the number of sites involved—is familiar from historical/comparative sociology. One or a few pilots could be selected, and if successful, they could be continued and others added. The current collection of LTERs arose in this way. However, it is important to recognize that the collection of LTERs is an *accidental* sample. Inferences drawn from an accidental sample can be quite weak. If a small-sample design is to be employed, a carefully thought out design developed *a priori* would provide a basis for stronger generalization beyond the individual sites.

Other workshop participants argued for a large set of sites, possibly in conjunction with a national survey. A full network of observatories could be designed at the beginning and the pilot(s) selected from within that design. This approach can accommodate a representative sample of sites as an eventual goal. The National Children's Study (NCS) provides an example of how one might draw a nationally representative sample ahead of time even if one cannot develop or fund the entire sample from the outset. In the NCS, 105 counties were selected as the primary sampling units of a nationally representative sample. (Montaquila et al. 2010). Data collection began in seven of those counties in 2009 and in another 30 locations in 2010 and 2011. University-based study centers are responsible for administering standard protocols as well as developing supplemental and adjunct studies of interest to particular scientists within those study centers. Although questions have been raised about the efficiency of such a decentralized approach (e.g., National Academy of Sciences 2008), the NCS does illustrate how a network of Centers might be assembled based on an *a priori* design.

Another question to be resolved is what data collection requirements should be imposed on the centers. In particular, should observatories have free rein to design their own data collection independently or should all observatories collect the same "minimum data" while allowing each one also to focus their synthesis in particular ways or to emphasize different supplemental topics? There was not time to discuss this issue in detail in the workshop, although it is worth noting that both the LTERs and the NCS involve core as well as supplemental data collection.

4. Place-based Regional SBE Synthesis Centers: New Sources of Rich Contextual Information

A well-designed network of synthesis centers can collect, assemble, and integrate the data associated with various social, behavioral, and economic sciences, and in so doing, can provide a platform for the integration of these sciences as well. The Workshop participants were particularly enthusiastic about the potential for place-based synthesis observatories to provide richly contextualized data for understanding decision-making, vulnerability, sustainability, social networks, and other processes. Rather than a single type of data, observatories might assemble a wide variety of data, including survey data, administrative data, commercial data, ethnographic observations and data collected through experiments to inform both social science theory and problem-driven research. This is, of course, easier said than done. In-depth knowledge is needed to collect new data and to compile and access existing data. Matching across data sources introduces new levels of complexity, including questions about privacy. Especially with data drawn from existing sources, it is important to be clear about the population that the data represent. This may be a place where matching back to census data can shed some light. Further, the units for which data are collected may not match the units within which sharing of economic and social resources occurs. In addition, the unit of observation may differ across data systems.

Survey, Administrative, and other Existing Data

A vast array of organizations, institutions, companies and other agencies routinely collect and maintain administrative data for their own purposes (Lane 2010: 660). These data are an important resource for social science research. Indeed, over the past several decades, the integration of survey and administrative data has opened up important new opportunities for research, especially on context and behavior (Sampson et al. 2002; Entwisle 2007). Linking survey responses for individuals to census information or administrative records about the census tracts, the schools and school districts, and workplaces makes it possible to consider neighborhood, school, and workplace effects on a host of individual outcomes. It is important to consider selective movement into and out of these larger contexts in drawing inferences about these effects as well as other design challenges associated with modeling dynamic systems. What appears to be a positive context effect in cross-sectional analysis may be no more than a tendency for individuals with unmeasured characteristics associated with positive outcomes to select those neighborhoods, and likewise individuals with unmeasured characteristics associated with negative outcomes to be left behind. These concerns notwithstanding, there is clear value in assembling, collecting, and integrating data from diverse sources on the individuals, households, groups, and communities in particular locales.

Many types of administrative data are of potential interest to social scientists. Their use for research purposes requires careful documentation; assessment of data quality, including potential missing data; reassembling of information into relevant units of analysis, variables, and response categories; and the like. In some cases, there is already substantial experience with these conversion processes. For instance, census-based measures of neighborhood poverty and median family income are very common in the social science literature. In other cases, while there is considerable excitement about the potential of administrative data for social, behavioral, and economic research, very little has been done so far to gather, document, assess, use, and disseminate these new forms of data. An example might be efforts to collect time use data using retrospective reports, diaries, and sometimes technologically enabled reporting. However, it is rare that this is paired with information about where respondents are spending this time. A combined time- and space- use report would be a great resource to really capture the connection between respondents and their spatial contexts. Very few studies of contextual effects take into account the fact that individuals move around in the course of their day. This would also be very helpful at a more macro level, as aggregating time-and space-use reports would help to define more meaningful neighborhood contexts and boundaries

An interesting distinction suggested at the Workshop is the distinction between “cultivated” and “wild” data.¹ “Cultivated” refers to data collected purposively by scientists for research purposes, such as survey data or data from experiments, that are collected using rigorous methods with a view towards testing underlying theories. “Wild” refers to data culled from flows of information occurring for other purposes, such as tweets, Facebook postings, or corporate information that serves business rather than statistical purposes (e.g. credit card records). The latter are an exciting new potential source of information about behavior that is at a finer social, spatial, and temporal scale than heretofore available. The data centers could play the role of domesticating and documenting wild data and providing methods that could also be applied by others to domesticate wild data. This will require a clear understanding of the context from which the data were derived. Additional major challenges here will be the need for innovative statistical methodologies for analyzing the newly-domesticated data and new approaches to combining information across data sets.

Many types of existing data are of potential interest to social scientists. Access to state and local administrative data also may be facilitated by having a local presence. Government officials typically “own” these data and they must be persuaded that sharing the data is in the public interest. Making this case is likely to be easier for a research team with an established interest in the local community than for a research team with no ties to the area.

¹ This distinction was initially suggested in the first meeting of the OECD Global Science Forum Expert Group on Data and Research Infrastructure for the Social Sciences held in October 2010.

Ethnographic and other contextual observations

Ethnographic work is inherently place-based, and becomes more productive and insightful the longer and more regular the contact is between investigator and subject, as trust results in greater disclosure, and familiarity reduces the likelihood that the subject will be acting in a particular manner because the investigator is present. Although in some scientific communities, there is concern that observation has the potential to change individuals and communities, the ethnographic literature suggests that the investigator becomes invisible over time (Bernard 2001). Ethnographic work is often thought of as purely qualitative and descriptive but this is a limited view of this type of research. Ethnographic work can be, and indeed must, draw as well on systematic, quantitative, and replicable research protocols that quantify the theoretically relevant aspects of life. Alongside in-depth interviews and participant observation (often the only aspects viewed as ethnography by those less familiar with this kind of research), the use of complementary ethnographic methods such as time allocation, systematic observation, social network measures, conversational recordings, and formal cognitive tasks are needed and used by a growing number of ethnographers.

Ethnographic research is conducted by scholars in anthropology, sociology, education, geography, public health, and psychology. It is viewed as essential to understanding the context within which people live, and a way to capture what is routinely missed by formal interviews, and survey research. It involves living with or accompanying people in their daily routine of life, and capturing what is so inherently familiar to the subjects of study that they routinely fail to mention these factors and experiences when asked in surveys..It also provides insight into the meanings that underlie the responses people give to standard questions. Indeed, the development of survey questions often begins with qualitative research, including ethnography. Perhaps most importantly from the standpoint of understanding context, ethnography captures the informal cultural, kinship, and social organization of households and groups within a community (Moran 1995), and the nature of relationships among them. A network of place-based synthesis centers would offer opportunities to integrate ethnographic with other data in exciting new ways.

We know that on a daily, yearly, decadal, and century-long basis, human decisions affect the use of land, water, air, energy, and materials in a society. These decisions, in turn, shape people's health and the environment in which they live. Yet we are only at the beginning of mapping out the systemic interactions of humans and environment in a way that will allow us to change these interactions to maximize sustainability while ensuring individual freedom and social justice. To do this, we will need studies of the behavior of many people in specific places over time with respect to the mundane decisions of everyday life (turning on the heat, going to the store, commuting, buying dinner), the more complex decisions of buying durable goods and houses, and the much more profound decisions of going to school, taking a job, choosing a place of worship, getting married, having children, deciding to

move, taking care of parents, and so forth. Ideally we need studies that consider the impacts of changing costs and prices, various kinds of social networks, different kinds of social organization, the vagaries of political decision-making, and ongoing environmental factors. These studies also should provide us with careful descriptive inferences, with maps and diagrams of locations, flows, and interaction, with the possibilities for comparison, with enough information to build reliable models, with embedded experiments—natural or contrived, and with an understanding of systemic relationships and causal mechanisms so that we can design better approaches for cities and regions to achieve ongoing sustainability. Observatories that collect and link administrative data, surveys, cell-phone information, internet data, sensor data, and other forms of information might be the very best way to meet this challenge directly and imaginatively.

Experiments

One of the areas where place-based observatories could play a transformative role in SBE science is by becoming hubs where experimental approaches in social sciences can advance the state of the science. A growing number of social sciences are adopting experimental approaches, in both laboratory settings and in the field. Beginning with experimental economics, it is possible to test propositions under highly controlled lab conditions to understand how people make decisions and how they deal with different constraints that they face. Much of this work began with college students and this work has proven to be very useful when carefully limited to conditions in which cultural and contextual factors do not play as large a determining role. However, for many important questions, the need for field based experiments become clear, and the need for context is essential to adequately run the experiments.

Because of concerns with external validity of laboratory experiments with student subjects, there is growing use of field experiments within experimental economics (Harrison and List 2004; Cardenas 2000; Lopez et al. in press). These have the benefit of greater external validity, while maintaining the controlled conditions that ensure internal validity. Laboratory experiments are less expensive to run and are less costly in terms of research personnel time, whereas the field experiments provide an opportunity to test decisions with subjects for whom the variables being tested may be more salient and more influenced by past experience, and often where the stakes are much higher. One important finding from common pool resource experiments is that face-to-face communication is a crucial factor in achieving cooperative behavior (Ostrom, Gardner and Walker 1994), and that in its absence subjects tend to overexploit resources (Poteete, Janssen and Ostrom 2010). In field experiments, this broad generalization was confirmed –e.g. when subjects were presented with information about policies that complemented their choices, in addition to finding that others were willing to act for the good of the group, resource use was near optimal (Lopez et al. in press).

The integration of experimental approaches with ethnography has particular promise as it can result in more robust integrative findings (Henrich et al. 2010:55; Henrich et al. 2005, 2004). There are two points. First, it necessarily brings research outside of the laboratory into diverse field settings as it expands the focus of data collection from college undergraduates to a broader population, enhancing the generality of the findings. Second, for experiments already planned for the field, an ethnographic component can inform the design and interpretation of the study in meaningful ways. Experimental studies regularly contradict claims from formal models based on behavioral assumptions of individual utility maximization of material returns. This has in recent years resulted in positing alternative utility functions based on other criteria (Henrich et al. 2004; Camerer 2003). Fully interdisciplinary study of human psychology demands an integration of ethnographic and experimental methods (Rai & Fiske 2010; Astuti & Block 2010; Shweder 2010). Ethnographic methods provide crucial insights for developing theory, designing experiments, and interpreting results, as well as for information for understanding the proximate causes of psychological differences (Henrich et al. 2004).

Relevant to this discussion is the growing sophistication of social science research on behavioral decision-making. Whereas the traditional model of decision-making was normative in nature, the contemporary literature suggests that decision makers are intuitive and that they have an overwhelming tendency to make context-based decisions, and to construct their preferences once a decision is made (Kahneman & Tversky 2000; LeBoeuf & Shafir 2005; Shafir and Tversky 1995). For example, people are more favorably inclined towards medical procedures when their chances of success, rather than failure, are highlighted. Similarly, ground beef, which can be described as 75% lean or as 25% fat, tends to be evaluated more favorably under the former than the latter description (Levin 1987). More dramatically, in some European nations drivers are by default organ donors unless they elect not to be, whereas in other comparable European nations they are by default, not donors unless they choose to be. The former have rates of organ donors of 98%, whereas the latter have only 15%, even though the transaction costs are low and the decision has great significance. Such framing effects are the result of “situated cognition” which results in decisions largely as a result of local or situational framing. Thus, human proclivity to make decision triggered by the local context of decision requires research that is experimental, that can provide richly detailed context, and that examines variables that are overlooked by other methods. This kind of research is second nature to social psychologists, but has yet to make its way to the core of other social sciences. Decisions, and behavior, are not simply rational in a normative sort of way but, rather, they include nuanced context-rich considerations that call for methods of data collection wherein it is possible to examine widely different perceptions, reactions and preferences (Shafir 2007).

Social experiments, such as the Negative Income Tax (NIT) Experiments and Move to Opportunity (MTO), and a much larger number of experiments to evaluate proposed improvements in K-12 education, link very well with these proposed

regional synthesis centers. MTO tested a few “interventions” in the way the government provides housing subsidies to encourage people to move to areas with a lesser concentration of poor families. NIT tested different approaches for providing cash assistance to the poor. NIT experiments were like MTO in that they experimented with alternative ways to shape policy, followed participants over time, and traced the development of their responses.

Experiments are a powerful methodology for generalization even when locally focused. One can ask questions across many sites whose generalizability is significant: if you give people more options do they make better decisions than when they have fewer options offered to them? If you increase the obstacles in obtaining social services, rather than decrease them, do you serve those in greatest need or those with the least need (but greater skills at gaming the system)? These kinds of behavioral insights are needed to improve social theory and social services alike. The questions and protocols can be largely general and the results generalizable, especially if locations are selected with an eye to heterogeneity among them. These experiments can be applied internationally as well, expanding the generalizability of results.

5. Place-based Regional SBE Synthesis Centers: New Data, Data Synthesis, Data Archiving and Data Distribution Roles

Data collection

The integration of diverse data and methods is a promising approach for addressing the core questions elucidated earlier, and place-based regional synthesis centers represent one way in which this might be done. The February 11, 2011 special issue of *Science* entitled Dealing with Data described a deluge of data across all fields, including the social, behavioral, and economic sciences (e.g., King 2011). If thoughtfully assembled and organized, carefully documented, and widely shared, these data have the potential to spur innovative new research. How to achieve this goal is a major challenge, of course. A network of social observatories could play a leadership role in the collection, synthesis, archiving, and distribution of social, behavioral, and economic data that would benefit fields individually and collectively for years to come. Following the language introduced earlier, each center could play the role of domesticating “wild” data and providing methods that others also could apply to domesticate “wild” data. One of the major challenges here will be the need for new statistical methodologies, new “linkage methodologies” and an understanding of the context from which the data came.

Workshop participants discussed how “place” might be defined operationally. There are many possibilities, including states, metropolitan and non-metropolitan areas, cities, counties, and even smaller units. One option discussed at the workshop was a focus on counties. If the centers use counties as the unit of analysis, the research would begin by a thorough understanding of that county, within the

context of other counties in the state and region, and how this county fits within the state data sets, the region and the nation with regards to the focal question addressed and cross-cutting questions across the various centers created. These county-level studies can provide a social laboratory in which to examine how various social policies such as Medicaid, education, and employment policies work themselves out locally (and how these local responses vary across other centers created). It would be ideal if the counties were sampling units in a national survey, such as the National Children's Study, but this would depend on luck and timing. In the case of very large counties, such as Los Angeles, this may not be the right approach. Counties vary a great deal in area and in population thus one must approach the selection of place very carefully in the design of these observatories.

It was noted by Workshop participants that while these centers should focus on the understanding of American society, that it should be encouraged that SBE scientists at these observatories develop international comparative components. This would allow the testing of ideas in different settings, and for testing the generalizability of findings from one setting in other national and international contexts. SBE science addresses social, behavioral and economic dimensions of the human species and as such it should beware of generalizing to humanity what may be specific to a region or a nation only.

Follow not just people but places

Longitudinal panel surveys follow people as they move from place to place, and that is a great strength. There is also benefit from following places. For example, in one of the questions posed for the observatories, we need to understand human vulnerability and resilience and to do so one needs to have continuous observation and not just going to a disaster after it occurs and collecting data and leaving. A lot of the human responses are time-dependent and involve important transitions that remain poorly understood. In the study of disasters or disrupted local economies, it is important to follow those who leave and understand how their lives have been affected, but it is also important is to continue observations at the place of the disaster to understand the consequences for those who remain and to see if the movers return, are replaced by new people moving into that space, or whether there is a complete restructuring of the places.

One advantage of following places is that it provides a natural context for interdisciplinary collaboration. Each discipline has approaches to contribute to understand human responses in a place, and this allows medical, educational, psychological, anthropological, economic, geographical and political perspectives to contribute. With one or a few major questions to provide focus, the results could be transformative. By and large the social sciences (with the exception of geography) have not adequately incorporated the importance of place in their analyses. This has begun to change (Entwisle 2007), and it seems like the right moment to transform the social sciences by making this a more integral part of social and behavioral analyses.

Data Synthesis and Distribution

The workshop participants saw an unmet need in the social science community for broadly conceived data centers, which could serve as repositories for data collected by social science researchers, work to integrate existing data, and provide technical assistance to academics and other research to facilitate the use of these integrated and hybrid data. Sites also could be a vehicle for providing access to sensitive data files and could retain expert staff responsible for technical activities such as data linking and could provide assistance to help ensure the proper use of the data and maintain the quality of the metadata.

These regional centers would assemble public records on individuals living in their region, including voting, property, library and driver's license records, and commercially available records. With participants' permission they could obtain nonpublic medical, credit card, social networking and other data that can be assembled. They can provide services such as checking for discrepancies in the information recorded and assisting in correcting erroneous information. A major focus would be data integration, including linkage of diverse units over space and time. They can provide a virtual as well as real gathering place for interdisciplinary teams to do their science, encouraging synthesis across SBE and other disciplines. They can sponsor workshops and visits by SBE scientists to access confidential information in secure ways. They can leverage administrative data and synthesize with field data.

There must be efficient, low-cost mechanisms to facilitate researcher access to the new data produced. Researchers outside the inner circle of the data producers should be able to use the data maintained by a center as a public resource, but the confidentiality of individuals identified in the data also must be protected. Ideally, the centers would contribute to a solution to this thorny problem. Another challenge is the volume of data to be managed, raising major questions about how to set up the data archiving and the cyberinfrastructure.

Some of the specific challenges these sites could help to address include the bringing together and organizing data from a variety of different sources. Today, there are substantial amounts of useful data coming out of non-traditional sources. The sites should be given the resources and have the capacity to begin to collect data from public, academic, private, and corporate sources. The observatories could play a particularly important role in identifying, extracting and providing access to local administrative data. In addition to coming from a variety of sources, these new data are collected and structured in ways that have profound analysis implications and that affect statistically-valid inference. These centers could serve as unique sites where innovative techniques for managing and integrating this data with traditional data types could be developed.

Most of the challenges associated with the operation of these types of centers are related to the data itself and the implications for the functionality of this type of endeavor. Even the more traditional data would present significant challenges and

in some cases might actually prohibit the integration of specific sources of data. Some of these difficulties include variability in data quality and inconsistent sampling which makes the geographic sampling units incompatible.

The most critical issue discussed at the workshop was the challenge of maintaining privacy and confidentiality when combining such detailed information about individuals. As more and more of this type of data linking occurs, the more significant the challenge will become. The local focus of the data collection, in combination with the fact that these locales will be known, increase these concerns. The idea of risk was broken down into two concepts. The first was the risk of being identified and the second the risk of harm based on that identification. Issues related to these risks and the relationship between them is still being discussed in the scientific community.

The discussion of the logistical structure of this type of observatory centered primarily on how researchers would access the data and what technical assistance they would receive. The workshop participants discussed a hybrid model in which researchers would have access to both a physical data center and a virtual data center through which data could be accessed remotely. This would mean that researchers could come to a facility site and have access to data as well as have persons to provide assistance. In addition, through some sort of secure remote access mechanism, researchers could have access to some types of data from their own home institutions. In terms of coordination, in order for a site like this to work, the center would require close relationships with institutions and organizations collecting the data as well as other types of entities and researchers doing similar data curating in other areas.

6. Place-based Regional SBE Synthesis Centers: Center Operation

Interdisciplinary collaboration is necessary at these synthesis centers, and indeed it is presumed that this is one of the strong reasons to create them. For this to work, a lot of time needs to be devoted at the outset to understand how to work together, and it requires substantive financial support and leadership to be effective. One must have a minimum critical mass of scientists with whom to collaborate and that represent a cross-section of the areas needed for synthesis, whether in residence or as a program of rotating visitors. There must be incentives to collaborate. The exciting questions, of course, is one important incentive, but substantive support for what are new directions for SBE science, are required to encourage these new modes of work. Essential too is the need for a physical place where researchers will come in and out. This does not necessarily mean investing in new buildings but it does mean allocating physical space for these observatories to function as places wherein collaboration can take place, whether from traditional scholars or from stakeholders who have insights and data to contribute, and who have a stake in the results.

There was discussion about using cyber networks to enhance the place-based observatories. In particular, these technologies were seen as a potential way to link

sites. Finally, an important aspect identified by the workshop participants was the mechanisms the observatory would use to coordinate its activities with a variety of partners and local stakeholders. In particular, participants at the Workshop were concerned with the observatories' ability to identify other research projects being conducted in the communities and include these in the synthesis. Finally, a number of people highlighted the development of relationships with local policy makers and community organizations as critical to obtaining the trust of the community, providing a channel for receiving the input of local policy makers in research planning and identifying potential opportunities for interdisciplinary academic collaborations.

Training Activities

A very important component of these observatories, and of moving SBE science forward in the next couple of decades, would come from innovative approaches for training social scientists. These proposed observatories constitute innovative ways to do research and serve the science community and stakeholders, and are deeply rooted in the places where research takes place connected as they are to local officials and local concerns. Training of students, postdocs, and young faculty will need to accompany this effort. Careful consideration should be given to the location of observatories to leverage interdisciplinary thinking and analysis through incorporating undergraduate and graduate students from the outset in the research and in learning to collaborate with other SBE disciplines and, when appropriate with other disciplines in the physical, biological and medical sciences. Innovative minors that require rigorous training in disciplines other than one's major, the develop papers and projects that are of more than disciplinary interest, and learning to communicate research to the local community and stakeholders will lead to a changed attitude towards research and serving society. Postdocs and young faculty, will play a key role as presumably they already represent some of these hybrid skills that would make the new observatories work as they should. This will mean that the more senior scholars will need to ensure that these younger scholars are adequately rewarded for their interdisciplinary work rather than be penalized as they might be in more purely disciplinary settings. Like some of the existing IGERTs, which have been effective in promoting interdisciplinary training on given domains of research (e.g. population & environment; forest ecology & local community management), the social observatories can coalesce interdisciplinary training through appropriate seminars, speaker series, meetings with stakeholders, visits to local schools, and in other outreach activities that would ensure that the science is relevant and meaningful to social actors and local communities.

Outreach Activities

Increasingly, science has to ensure that the questions and the findings from research are meaningful and useful to society and to people who may be affected by the

results. One way to ensure that this happens is to involve from the outset the local community as participants in the refinement of research questions, some components of design, the process of data gathering, and how that data is used to inform the life of members of communities. This remains one of the challenges to the practice of science, given traditions which privilege the formulation of questions, the choice of methods, and the development of theory over its relevance to society. The proposed observatories, because they are place-based, and have as one of their charges to obtain local administrative data and commercial data, and to provide in-depth knowledge of the place selected by the sampling strategy, must by inclination and mission make sure that they develop a broad range of outreach activities that engage the community throughout the life of the observatories. Moreover, these observatories are designed to bring in points of view and data from non-traditional sources which further expands their ability to reach deeply into the inner working of the local communities. Archiving these views, and integrating them with the domesticated data from researchers, can further enrich the texture of the results and the value for the community.

Evaluation

These observatories will need to go through a thorough process of evaluation, before grants are awarded, and then throughout their existence. First and foremost, the observatories need to be created and maintained on the strength of the science that they do, on a broad representativeness of the various SBE disciplines, on the participation of exceptional scholars, and on support and engagement of the local community. All of these elements should be required and signs of increasing effectiveness should be measurable in determination of continued funding. At the outset, the successful applications need to show evidence of feasibility of obtaining administrative data from local officials, of engagement with the local community and their interest in the goals of the observatory, and in seeing the interconnectedness of disciplines in addressing the questions posed. They need to show how they will leverage existing studies, and build a portfolio of research projects that address the cross cutting questions that underlie the network of observatories. They need to commit to core data collection across the observatory network, and also show signs of what sorts of additional research questions and data they will collect that are meaningful to the local community.

Lessons Learned

The experience to date with physical observatories, and other data infrastructure programs provides lessons and cautionary notes as one thinks about developing a network of social observatories. The need for these observatories comes from a variety of past workshops that documented a lack of the awareness, preparedness and capacity in the social, behavioral, and economic science community to collect, organize, and manage the broad array of regularly and irregularly collected social, economic and political data.

1. While a long-term vision and plan are essential, it is not necessary to build an entire observatory network either at once or from scratch. The LTERs, for example, built on the previous IBP observatories and a larger network evolved over time, driven by PIs with interesting questions that merited competitive NSF funding. While it rests on a more integrated plan, the NEON network also is built on pre-existing infrastructure. Longitudinal surveys are a crucial part of SBE research infrastructure, and one possibility would be to develop the network of social observatories in conjunction with one of these surveys. Starting with a set of pilots selected in reference to the overall plan and allowing them to develop in an organic fashion within the parameters established by that plan may be the most realistic approach to developing a network of social observatories especially given current economic constraints.
2. Interdisciplinary research can yield substantial benefits but realizing those benefits requires a long-term commitment by NSF. Collaboration across disciplinary lines is hard. It requires a critical mass of scientists from different disciplines focused on a set of cross-cutting questions and positive incentives for each of them to sustain interactions that may not yield an immediate payoff.
3. Sustained long-term funding is a necessity if the benefits of a network of observatories are to be realized. An example is the integration of social sciences in the LTER network, which began with modest investments in a few LTER sites, then developed by funding two urban LTER sites, and after a decade or more of experiences resulted in a Decadal Plan recently formulated for integrative socioecological research across the LTER network.
4. Support for investments in important new infrastructure need not come at the expense of investments in older research models. Many segments of the larger ecology community did not support development of the LTER network, fearing that growth of the LTERs would erode support for traditional ecological approaches. On the contrary, the LTER observatories have represented a quantum increase in new support for ecology, sustained over nearly 30 years, without a decline in support for those who chose not to engage in “Big Ecology,” as ecosystem ecology was called by some (Coleman 2010). The LTER network and Big Ecology asked different questions, at different temporal and spatial scales, than traditional patch-based experimental studies—and both small and big ecology continue to advance the state of knowledge in ecology. The same could happen within the social sciences if a decision were made to develop a network of SBE observatories as a complement to the existing large national survey infrastructure. This is not a zero-sum situation. We need to find ways to move ahead and create platforms for transformational research in SBE science.

Recommendations

Workshop participants recommend that NSF encourage a follow-up workshop to develop a plan for the network of observatories, with particular attention to the design of a fully fleshed-out set of centers, and an initial call for proposals focused on a pilot or set of pilots to inform this overall design. The following

recommendations provide an agenda for the follow up workshop to fully realize the objectives of this Workshop

1. There was most enthusiasm for a hybrid model —part observatory, part laboratory, part thematic center, and part data synthesis center. Workshop participants recommend that the follow up Workshop focus on this hybrid model and to fully flesh out the details as its main goal.
2. Observatories based on this model would be geographically distributed across the nation in order to provide a set of nodes to collect primary survey, ethnographic, and experimental data as well as mining pre-existing local and regional data sources and making these various data sources available to the social science community. A major focus would be data integration, including linkage of diverse units over space and time.
3. This kind of data integration and data mining will require new control methodologies that ensure data privacy and confidentiality and ensure data security
4. The vision was of a network of observatories designed from the ground up, growing organically from one or a small number of pilots to a geographically distributed system with core data collection on one or more of the five broad questions but with flexibility in expanding the data collection depending on local/regional issues of particular concern or urgency to local stakeholders and the science community
5. For the pilots, the call for proposals should identify as minimum requirements a core of new place-based data collection at local to regional scale and cyberinfrastructure, data archiving, synthesis, analysis and distribution. Undergraduate and graduate training and community engagement are highly desirable components. Fleshing out these details will be an important task for the follow up Workshop.
6. Many questions need to be addressed by the follow up workshop, such as should observatories have free rein to design their own data collection independently or should all observatories collect the same “minimum data” while allowing each one also to focus their synthesis in particular ways or to emphasize different supplemental topics? There was not time to discuss this issue in detail in the workshop and these should be taken up by the follow up workshop
7. Each of the pilot Centers should be subject to an initial process evaluation after three years, to ensure that planned efforts have been successfully launched, with a more substantive evaluation of accomplishments after five years. One important yardstick will be at how well the pilot centers are moving towards brokering new data sets, and making new data available to the SBE community (particularly commercial and administrative data).

In short, experience with the pilots will inform the SBE Directorate as to whether investments in additional Centers are warranted or whether it is wiser to acquire additional experience with the original pilots before making that decision. Sustainability is critical. Many if not most of the potential benefits of the proposed

Centers will be realized only over a period of many years and initial investments could to a large extent be wasted if successfully-operating Centers were not given the means to continue their work over that time scale.

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