National Science Foundation Directorate of Social, Behavioral, and Economic Sciences

SBE 2020: White Papers

Titles, Authors, and Abstracts

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Introduction

In August 2010, the Social, Behavioral, and Economic Sciences Directorate of the National Science Foundation (NSF/SBE) invited members of concerned research communities to submit white papers outlining the future of their sciences on a decadal scale in a project named "SBE 2020: Future Research in the Social, Behavioral, and Economic Sciences." Prospective authors were asked to describe foundational and transformative questions in the content of their science, the skills and capabilities required to pursue those questions, and the infrastructure of services and resources that would enable such research. Authors were encouraged to address one or all of these topics but to keep their focus on the big questions that transcended near-term funding cycles and were likely to drive next generation research in the social, behavioral, and economic sciences.

This compendium of abstracts to the 252 unique contributions resulting from that invitation is an introduction to their answers. Most of the full texts of the white papers can be downloaded from the companion website (http://www.nsf.gov/sbe/sbe_2020/.), where they can be searched by corresponding author (that is, the author who submitted the document), title, and abstract. Because many of the papers had more than one author, this publication also provides the complete list of authors. The abstracts have been modestly edited to insure consistency in capitalization, punctuation, and style. Analysis of the white papers together with continued discussions with our colleagues at NSF and with the scientific community are steps in a longer process to identify topics and priorities for future research. We encourage readers of this publication to revisit the SBE 2020 website to find out more about what we are learning from these activities and about our future plans.

We are grateful to the authors of the white papers for their willingness to develop their ideas, and for their generosity in making their contributions available to us and to the broader scientific community. We also wish to thank our colleagues at NSF: Deborah Livingston, Theresa Rinehart, John Gawalt, Peggy Gartner, and Christina Jones, for their help throughout the process of soliciting and collecting the white papers and then preparing them for distribution. Their hard work and the researchers' visionary contributions enrich the future for the SBE sciences and the American people.

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February 2011
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The White Paper Abstracts

The abstracts are presented in order of the last (family) name of the corresponding author. An ID has been assigned by the underlying database system and forms part of the name of the electronic file on the website, which contains the full text of the paper if the authors gave permission to release it.

Challenges for Social Sciences: Institutions and Economic Development

White Paper ID 88

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Abstract: A major area of future research will be the role of institutions in economic development. Future progress in this area is likely to come from a combination of economic analysis with insights from other social sciences.

Advancing Ethical Research Across Disciplines

White Paper ID 139

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Abstract: As digital environments engender new forms of research and collaboration, and as scientific discovery evolves, how can we equip scientists for the moral, ethical, and socio-political questions and dilemmas that this new landscape for research brings? Research ethics and the responsible conduct of research (RCR) will transform in tandem with this changing landscape over the course of the next 10 years. This transformation is a grand challenge, not just to the disciplines of research ethics and RCR, but to all of science. This white paper will explore how RCR will change over the next ten years by observing the imperative questions and potential issues that RCR as a discipline must face, describing how infrastructure must facilitate learning and sharing across disciplines, how multiple parties are impacted by these questions, and how researchers, both current and future, will shape this new landscape.

Future Considerations for Archaeology at Altitude

White Paper ID 270

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Abstract: The Wind River Range spanning 100 miles of northwestern Wyoming has emerged as a current hot spot for high altitude and Late Prehistoric/ Protohistoric archaeology in the past several years. Of great interest are ten villages at the alpine/sub-alpine ecotone found in the Wind River Range. Chronologically 6,000 years of prehistory is represented at or around these village sites. The climax species at this ecotone is whitebark pine (Pinus albicaulis) which is being threatened throughout its range in western North

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America by pine bark beetles and blister rust. The result of the whitebark pine die-off is that treeline is lowering and the context for interpreting the alpine villages is disappearing. Alpine archaeology is an emerging niche in a long established field, a field that is danger of disappearing as the whitebark pine forests disappear.

Pushing the Boundaries of Economics

White Paper ID 45

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Abstract: The fundamental question for economists is to understand why certain countries (nations, regions) have developed successfully while others are lagging behind. Answering this question will of course help in understanding how to defeat poverty. In recent years, economists have made progress by extending the realm of variables included in their models, empirical analysis, and overall thinking. Examples include political economics (bordering with political science); behavioral economics (bordering with psychology); law and economics (bordering with law, of course); and recently, cultural economics (bordering with sociology and anthropology). A new but rapidly growing body of research is taking, instead, the idea of including culture defined as the customary beliefs, social norms, and material traits of a nation, racial, religious or social group. Examples of cultural values which are very important for understanding economic development include trust and social capital, the structure and organization of the family, the role of women in the family and in society, and religious beliefs, amongst others. The question is how culture affects various aspects of economic behavior and how culture evolves. Does culture easily melt, or are cultural traits very persistent? What has led historically to the development of certain cultural traits?

Multiple Skills, Multiple Types of Education, and the Labor Market: A Research Agenda

White Paper ID 124

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Abstract: I propose a major program of research on skill, education, and the labor market. The program will build on four facts. First, ability and skill are multidimensional. Second, secondary and postsecondary education is heterogeneous in quality and in the types of skills and knowledge provided. Third, jobs differ substantially in what they require. Finally, technical change, globalization, and shifts in the composition of demand for goods and services alter the demand for particular skills in the labor market relative to supply, with important implications for the wage distribution. In essence, the research program will place the multidimensionality of ability, skills, and knowledge at the center stage of theoretical and empirical research on child development, educational attainment, and labor market careers.

Endangered Languages and Linguistic Infrastructure

White Paper ID 229

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Abstract: It is not just species which are disappearing at an alarming rate: human languages and the cultures for which they are the vehicle are in every bit as much danger of destruction, and of ultimate loss to science. Though increased funding for linguistic fieldwork is important to stem this tide, encouraging the use of data that is freely interchangeable is essential, as is funding the tools, applications and protocols which would make this possible. The field of linguistics and the related field of anthropology stands to benefit

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enormously from the data management schemes and data manipulation tools provided by an interoperable cyberinfrastructure for linguistics one which would merge data creation and data management, enable searches across massive amounts of annotated data, and foster the production of high-quality, integrated data by enhancing facilities for data comparison.

Where They Live: Community Media Centers as Hubs for Building Technological Literacy, Media Literacy, and Active Citizenship

White Paper ID 214

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Abstract: Education is becoming a 24/7 experience driven by media experiences and technological exploration. The challenge is to find innovative ways to develop technological literacy, media literacy, and active citizenship in non-traditional educational systems. Community media organizations are each unique possessing talents, strengths, and ingenuity to reach people where they live by providing learning opportunities across the lifespan and across the socio-economic spectrum in communities around the world. In these centers, access exists for education in computing, media literacy, academic content, creative expression, workforce preparedness, or to learn means of affecting social change. Research will show how developing these organizations can create important hubs connecting people with educational systems, as well as serving to develop innovative technologies for the public good. Technological, creative, social, economic, and organizational development disciplines all have a stake in community media as providers of the environment, equipment, and education for gaining the skills and literacies needed in the 21st century. By building capacity in these valuable organizations, new opportunities will emerge for technological, educational, and social innovation including strengthened learning of desired skills and literacies, utilization of newly developed digital arts teaching and learning practices, and increases in equitable access to the public media discourse.

How and Why Do Close Relationships Shape Human Behavior?

White Paper ID 180

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Abstract: Human close interpersonal relationships have been convincingly demonstrated to have very large (often the largest effects of any variables studied) on virtually all aspects of life, including well-being, health, and diverse social phenomena ranging from crime and prejudice to workplace productivity and education. Findings are also clear and compelling that virtually all aspects of individual experience (e.g., emotion, cognition) that shape behavior are created or molded by relationships. Research, especially in the last 25 years, in a variety of disciplines and using widely diverse methods has made tremendous progress in identifying the underlying mechanisms behind these various effects, and in formulating theoretical models about their operation. However, the central importance of relationships for all facets of human life (including for understanding basic behavioral processes) and the demonstrated ability of scientists to study these phenomena systematically, precisely, and successfully, has only begun to be appreciated in the various major disciplines. Nevertheless, it is now clear that the scientific study of close relationships to date has laid the groundwork for the social and behavioral sciences to make enormous, unprecedented advances in both basic knowledge of human behavior and the application of that knowledge to the most significant social issues facing humankind.

Grand Challenges in the Study of Employment and Technological Change

White Paper ID 98

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Abstract: Two forces are rapidly shifting the quality of jobs, reshaping the earnings distribution, altering economic mobility, and redefining gender roles in OECD economies: employment polarization, whereby job opportunities are increasingly concentrated in high-skill, high-wage jobs and in low-skill, low-wage jobs; and a reversal of the gender gap in higher education, reflecting women's rising educational attainment and men's stagnating educational attainment. The result is a labor market that greatly rewards workers with college and graduate degrees but is unfavorable to the less-educated, particularly less-educated males. The economic and social repercussions of polarizing employment growth and stagnating male educational attainment present a challenge and an opportunity for cross-cutting, policy relevant social science research.

National Communication Association's Response to Dear Colleague Letter

White Paper ID 255

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Abstract: In this response, we advocate for the study of science communication in public and private phases. We argue that the investigation of communication processes in each phase will contribute to the improved creation and dissemination of science.

Documenting Extant Cultural Collections: A Grand Challenge for the Social Sciences

White Paper ID 161

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Abstract: One of the biggest questions facing field-based social sciences is not a conceptual conundrum but the practical problem of how much and what kinds of information already exist. In the absence of either a focused national survey of existing cultural collections or generally-accepted metadata standards to allow inter-institutional comparison of extant datasets, it is impossible for researchers to effectively determine whether data to address substantive research questions already exists. As a result, NSF makes awards to generate datasets which may have been previously collected, and in the absence of policies requiring proper curation of new datasets or standards whereby such datasets could be easily accessed, the problem is compounded with time. Five initiatives are proposed to address this grand challenge: (1) development and deployment of metadata standards for cultural collections; (2) a national survey of existing cultural collections; (3) award programs to fund curation of existing datasets and collections; (4) research award programs focused on the use of extant datasets or proposing new techniques to employ existing collections in novel ways; and (5) new policies for grant recipients requiring that appropriate arrangements for curation of materials and associated documentation be demonstrated as part of funded proposals.

Comments on Grand Challenges

White Paper ID 61

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Abstract: The judgments and decisions of citizens in democracies affect long-term outcomes. Democratic governments seem unable to cope adequately with long-term and international problems, and even some local problems. I suggest that studies of citizens' judgments could help. Likewise studies of ways institutions could help citizens express judgments that were more helpful. I also discuss the general problems of funding research in relevant areas. I argue for funding more investigators, with less money for each. To some extent, the idea of picking winners may push us in the opposite direction.

SBE 2020: Twenty-first-Century Challenges and Opportunities for the Human Sciences

White Paper ID 272

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Abstract: In today's globally-connected urban society of over 6.5 billion people, human decisions have consequences that will define the future for all of humanity. Yet societal support for science aimed at understanding and controlling the natural world dwarfs by many orders of magnitude support for a scientific understanding of the social processes that now shape it. It is urgent that the United States begins a program of significant and targeted investment in an integrated science of social and behavioral dynamics, or human sciences, with the goal of rapidly developing advanced scientific capacity in this domain. We recommend that NSF stimulate development in the human sciences by focusing on three integrated levels of support: (1) enhanced support for disciplinary programs; (2) collaborative, integrative research targeting theory for human sciences, the interaction of human and natural systems, the dynamics of human systems, new technologies for human systems science, and research collaboration networks; and (3) a national network of centers for advanced research in the human sciences to provide facilities for integrative activities like workshops and training, digital libraries to make datasets, models, and software accessible, and incubators for large-scale integrative research which can produce scenarios and forecasts for public policy at multiple levels

Correcting the Mathematical Foundations of the Social and Economic Sciences

White Paper ID 39

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Abstract: Errors at the mathematical foundations of economic theory and the social sciences require corrections. For example, for the same reasons that the mathematical theory of thermodynamics cannot be founded on ordinal temperature scales, modern economic theory cannot be founded on ordinal data; additional examples of fundamental errors are given. The conditions for applicability of the operations of addition and multiplication have not been identified; there is no proof in the literature that these operations apply to any scale; and, in fact, they do not. In particular, interval and ratio scale classifications do not imply the applicability of the operations of addition and multiplication and these operations are applied incorrectly and where they are inapplicable. Although the issues stem from the most fundamental questions of applicability of mathematics in these disciplines, it appears that most, perhaps all, of these errors can be corrected.

A Grand Challenge for Linguistics: Scaling Up and Integrating Models

White Paper ID 81

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Abstract: The preeminent grand challenge facing the field of linguistics is the integration of theories and analyses from different levels of linguistic structure and aspects of language use to develop comprehensive models of language. Addressing this challenge will require massive scaling up in the size of data sets used to develop and test hypotheses in our field as well as new computational methods, i.e., the deployment of cyberinfrastructure on a grand scale, including new standards, tools and computational models, as well as requisite culture change. Dealing with this challenge will allow us to break the barrier of only looking at pieces of languages to actually being able to build comprehensive models of all languages. This will enable us to answer questions that current paradigms cannot adequately address, not only transforming linguistics but also impacting all fields that have a stake in linguistic analysis.

A Proposal for Future SBE/NSF Funding: Refocusing Microeconomic Policy Research

White Paper ID 281

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Abstract: How can the NSF harness large and vital research efforts in econometrics and economic theory to address our era's most important microeconomic, social, and climate policy questions? The goal presented in this white paper is to refocus the economics profession's more technical fields of inquiry on ideas and tools that are relevant to policy, while making sure that the most useful newly developed ideas and tools are actually adopted in policy analysis. Examples of applications include bio-fuels/global warming, health care reform and education choice. Policy analysis in each of these examples requires the use of econometrics and economic theory together with a well-informed understanding of institutions and policy. Increased cross-sub-disciplinary efforts within economics and allied fields could have important social payoffs.

Researching Social Media in the 21st Century

White Paper ID 75

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Abstract: Research about information seeking behavior should be reassessed given the evolution of the World Wide Web as an interactive medium. Preliminary data indicates the general public has included social media as a source for information on a variety of issues. Social authority has become an important adjunct to understanding the role of influence in mediated messages. Demographic segments attending to social media while still young will creep into more mature segments in the upcoming decade. Research on information seeking must move past traditional platforms as an object of study and recognize that individuals increasingly turn to social media to find information. The following ten recommendations offer some guidance for methodological design and assessment and overall media related research about the general public in the upcoming decade. Minimally, SBE researchers should include social media as a subject for their research. Optimally, a major effort to understand what is happening when information seeking behavior involves social media should be instructive.

Migration, Multilingualism, and Minorities: New Challenges for the Linguistic Sciences

White Paper ID 250

Abstract: One of the fundamental questions in the humanistic social sciences has to do with the understanding of the relationship between language and culture; specifically, how the social laws of linguistic conduct appear and efface as communities of different cultural practices come into direct contact with each other, more so now as globalization seems to have made geographic boundaries

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less relevant and global mobility more intense. In this new modern context of intense mobility, the question that seems pertinent is: what are the new paradigms of understanding of the inter-relationship of language and culture within new configurations of migration settlements? This broad research question invites several inter-related issues of language and culture: (1) how are cultural identities in transplanted contexts linguistically acquired and realized; (2) what is the role (and nature) of linguistic practices in boundary maintenance or disruption in global, transnational, and translocal contexts; and (3) how are local practices and processes produced by migrants and other people who cross various kinds of social, linguistic, cultural, economic and workplace borders in socially stratified and ethnically plural social settings. The challenge is to develop new theoretical and methodological perspectives that can adequately address these questions.

Melding Milk and Iron: The Affective Power of Pre-Colonial Science in Post-Colonial Africa

White Paper ID 142

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Abstract: This research addresses the question of how knowledge is transposed into new social orders due to political ruptures. It theorizes that knowledge bases that informed formerly public events retreat to the domestic sector where they retain a powerful affective presence in the way people understand the world around them. It thus sheds light on how political action is constructed out of long-standing social understandings that are difficult to elucidate in public discourse. The specific approach here seeks the ideas that fueled the African cattle complex studied in the 1920s by Melville Herskovits, and pursues their continued saliency in the post-colonial social dispensation. Further conceptual links between the cattle complex and indigenous understandings of iron production hint at the broad historical encounter between these two pre-colonial sciences. These linkages will allow a new theory of African political economy, and a fresh analysis of Julius Nyerere's influential policy of African socialism, known as "Ujamaa." This research responds to Gabrielle Spiegel's edited volume, *Practicing History: New Directions in Historical Writing after the Linguistic Turn*. It will present a methodology for approaching the deep-set, often invisible, social forces at work in contemporary history, thus giving new direction to political, anthropological, and medical research.

Social Technical Congruence: The Link Between Social Science and Technology

White Paper ID 233

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Abstract: Technology and global connectivity are driving economic growth through the world at an increasing pace. The field of social technical congruence (STC; Cataldo et. al., 2006) has recently developed to understand the synergies between technical development and communication. Implementation of the STC perspective can guide the design of more innovative products, processes and services to stimulate the US economy. Designing a product, process, or service requires communication, collaboration, and a shared understanding of the problem at hand. Communication patterns of the individuals working on the design as well as dependencies between various sub-parts of the product being designed are intricately entwined and affect the overall quality of the final outcome. STC has been successfully applied to the software development process to identify how much people should be communicating and who they should be communicating with. While the current STC research community looks primarily at software development, we envision that these general concepts and algorithms will have a positive impact on many design processes. The fundamental research question is how can the social communication and task dependency networks between users be modeled and applied to improve the design of products, processes, and systems?

White Paper for NSF Grand Challenges

White Paper ID 123

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Abstract: This short piece outlines some of the topics I see as part of the grand challenges for the social sciences over the next 10-20 years. I have focused on three areas where I see the policy agenda being particularly constrained by the lack of high-quality research.

Robustness and Fragility of Markets: Research at the Interface of Economics and Computer Science

White Paper ID 162

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Abstract: Market behavior is the central topic of economics. Yet while economists have a good understanding of the behavior of well-functioning markets, we have little to say about market fragility, market resiliency, and market collapse. Research emerging at the frontier between computer science and economics offers new ways of addressing this important issue.

Semantic Typology as an Approach to Mapping the Nature-Nurture Divide in Cognition

White Paper ID 95

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Abstract: One of the central projects of the cognitive sciences is the determination of which aspects of cognition are biologically determined -- directly or mediated by neurophysiology -- and species-specific, and which aspects are culture-specific and learned. Semantic typology, the crosslinguistic study of semantic categorization in natural languages, plays a key role in this project. The task of mapping the nature-nurture divide in semantic categorization can be compared to the task of mapping early human migrations to their reflexes in the contemporary gene pool. Progress in semantic typology has been hampered by a longstanding bias in the cognitive sciences in favor of postulates of underlying uniformity and innateness, but also by the inherently collaborative nature of semantic typology and the multi-faceted training it requires. Funding institutions such as the National Science Foundation can and should play a key part in correcting this situation.

SBE 2020: Quantitative Convergence of Lifespan Development, Neuroimaging, and Genetic Epidemiology

White Paper ID 207

Abstract: This white paper discusses the potential benefits of the interdisciplinary convergence of three areas: lifespan developmental psychology, neuroimaging and neurophysiology, and genetic epidemiology. This three-discipline convergence is likely to occur within the next 10 years due to shared interests of the three areas, each of which has come to understand that their own future progress is limited by the need for the other two. One main interface at which these disciplines are communicating is through recent developments in intensive time series, which are needed in each area and

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which affect the rate of discovery in each. The benefits of convergence are large: for instance, improvements in diagnosis and delivery of personalized medicine hinge on advances that require the coordinated effort of these three areas. However, funding mechanisms for three-discipline projects and centers are very limited. This white paper proposes that the National Science Foundation create initiatives that will speed the synthesis of theory, methodology, and results from genetic epidemiology and functional neuroimaging over the course of the human lifespan. The proposed synthesis poses difficult challenges, but the rewards are great.

Complex, Heterogeneous Teams Solving 21st-Century Problems

White Paper ID 129

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Abstract: The growth of the Internet and advances in robotics and developmental science have demonstrated that large-group problem solving is a spontaneous and now measurable phenomenon. What is less appreciated is that the heterogeneity of these groups (team members may be people, physical devices, or problem-solving algorithms.) as well as their internal structure (communication lines between individual members) greatly impact the team's efficacy. In the coming decades, groups dedicated to a common end will grow greatly in size, exhibit a more heterogeneous membership, maintain complex internal structure, and all three group characteristics will dynamically vary over time. One of the primary challenges will be to investigate how such groups form, and also how social, cyber- and physical infrastructure can be constructed to facilitate the birth of effective groups, given the large-scale problems to which they apply themselves. Two questions that emerge from these observations are: (1) How can social, cyber- and physical infrastructure help such groups form? (2) What conditions optimize the performance and problem solving success of large, heterogeneous, internally complex groups?

The Grand Challenge of Understanding Group Effectiveness

White Paper ID 220

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Abstract: Human beings are social and have devised their cultures, societies, communities, organizations, and families in such a way that the group is the primary social unit. This is prima facie evidence that acting in concert -- collaboration in group effort -- is a human universal. This ubiquitous formation and reliance on groups indicate that generally groups do succeed naturally in achieving a minimally adequate level of performance. However, we are not quite sure how group members address interactional (in)consistencies; nor, are we clear how groups achieve a level of minimally acceptable competence. This grand challenge response moves the central question about groups and teams from individual-level examination to examination of the interdependencies of group members. We posit that group and team scholars need to make headway on the more productive question of what the naturally occurring basis for collaboration in group effort is, and from there, what is contingent and improvable.

The Science of Team Science (SciTS): A Beacon for 21st-Century Scientific Collaboration

White Paper ID 308

Abstract: Social, economic, technological, health, and environmental problems impacting our world are complex, but we are able to increasingly address them through scientific pursuit. The sophistication of these challenges necessitates cross-disciplinary engagement and collaboration, and the longer-term interaction of groups of investigators team science (TS). The emerging field of

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the science of team science (SciTS; pronounced sights) encompasses conceptual and methodological strategies aimed at understanding and enhancing the processes and outcomes of collaborative, team-based research, and the evaluation of TS. Its principal units of analysis are research, training, and community-based team science initiatives. SciTS focuses on antecedent conditions, collaborative processes, and outcomes associated with initiatives rooted in TS, including scientific discoveries, educational outcomes, and translations of research findings into new practices, patents, products, technical advances, and policies. This white paper describes recent research progress in the study of TS via SciTS. It proposes a systems perspective that incorporates a mixed-methods approach to SciTS commensurate with the conceptual, methodological, and translational complexities addressed within the SciTS field. This theoretically grounded and practically useful framework is intended to integrate lines of SciTS research to facilitate the field's evolution as it addresses key TS challenges spanning macro, meso, and micro levels of analysis.

Future NSF Economics Funding Priorities

White Paper ID 58

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Abstract: Future priorities fall into five categories: theory, measurement, econometrics, aggregation, people. Some key challenges and opportunities in each area are presented.

Teaching and Evaluation of Interdisciplinarity

White Paper ID 86

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Abstract: NSF is appropriately devoting greater and greater resources to questions and problems that are best addressed though research across disciplinary divides, yet an interdisciplinary team member's skills, awareness, and methods for creative and innovative thinking in groups and across disciplines often lag far behind the demand. We propose that NSF establish an interdisciplinary methods research center for developing and iteratively testing effective and transferable interdisciplinary pedagogy for graduate students at the beginning of their professional careers, methods of faculty preparation for delivering interdisciplinary pedagogy, and evaluation tools and metrics.

Expanding Multivariate Models

White Paper ID 136

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Abstract: The AIDS epidemic and environmental change are challenges beyond the scope of any single discipline and suggest that future challenges will be equally, if not more, complex. The use of multivariate analysis across disciplines has been essential to addressing data analyses associated with these challenges. The thesis of this paper is that the full potential for multivariate analyses has yet to be fully explored. Explorations beyond our current mind-body divide are possible with multivariate approaches. We envision that it will be possible to use new technologies to expand explanations for human behavior. Nanodevices, initially intended for medical examinations, can be used to gather phsiological data to analyze with social cognitive factors along with possible correlates of brain patterns as markers of human emotions. Satellite mapping can reduce the difficulty of getting random samples in densely populated urban settings of hard to reach subpopulations. The continued increases in power and miniaturization of computer processing chips can revolutionize the potential for data collection and challenge the ways in which that data is analyzed. Perhaps there might be physiological markers of validity to human responses that might reduce our exclusive reliance on probabilistic tests of significance to accept or reject hypotheses.

Integrated Social Science: Exploring the Dark Matter of Human Cultures and Societies

White Paper ID 29

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Abstract: An emerging new perspective in the social sciences combines findings and models from evolutionary biology, experimental psychology, behavioral economics, and cultural anthropology to explain how human cultures and social norms are created, transmitted, and transformed. This new approach is not just of academic interest but can also help us better handle crucial social problems.

Coupling Human System Data with Natural System Data: Laying a Foundation for Sustainability Science

White Paper ID 188

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Abstract: One of the most critical challenges facing next-generation social, behavioral, and economic research is to understand the dynamics and consequences of interactions between human systems and the natural world. To accelerate scientific progress, significant and systematic efforts must be made to identify and collect data across time and space that enable evidence on perceptions, attitudes, social institutions, situation-behavior relationships, and decision making to be linked comprehensively to measurements of the natural environment. These data will lay the foundation for a science of sustainability.

Improving Measures of Democracy and Governance

White Paper ID 191

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Abstract: We propose a major funding effort across the social sciences to research and improve global indicators of governance and democracy. With advances in the quality and availability of data on elements of national and subnational governance and democracy and with progress on the conceptualization and design of relevant indicators and on the caliber of measurement, we can look both to transformative scholarship in the social sciences on understanding comparative and international politics, development, and social change; and to more useful guidance to practitioners who are directly engaged in changing the world.

Social and Political Dynamics under Intensifying Climate Change: Proposal for a Long-Term Data Collection Project

White Paper ID 240

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Abstract: The grand challenge for the social and behavioral sciences and humanities is to develop better models of complex societal decision-making processes so as to help mitigate and adapt to global climate change. Climate change represents the largest collective action problem: how to get self-interested actors to cooperate for their own long-term collective good on a global scale. Research on this complex question requires data on the process of national and international responses to intensifying climate change over the next decades. Adequate data must include social, cultural, relational, institutional, and behavioral aspects at the detailed level of how agencies, organizations, and publics evaluate, mobilize, pass, and implement decisions that affect GHG outputs. The National Science Foundation should establish a global monitoring system (a social science equivalent of NEON) to collect the needed data. This database will give social scientists a common empirical foundation to break through their disciplinary silos and unlock a new cycle of conjoint research on complex response processes at a higher level of integration. The NSF-funded research on Comparing Climate Change Policy Networks (Compon) provides a good model of such an international data-gathering and hypothesis-testing project.

Beyond Despair: Next Decade Research Strategies to Promote Health Equity among Racial and Ethnic Minorities

White Paper ID 76

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Abstract: Disparate health outcomes among racial and ethnic minorities are a long-entrenched feature of American society. For decades, scholars have attempted to disentangle health disparities from their roots in social and economic inequalities. Despite these efforts, the systematic, structural, social, and biological forces that underlie health inequities are so pervasive that no single strategy in isolation can address their detrimental effects. The following paper highlights our recommendations for future strategies in the field of health disparities research. In it, we emphasize the importance of incorporating approaches that fuse current knowledge within interdisciplinary frameworks comprised of teams of community members, scientists, and policy makers dedicated to creating sustainable solutions for equity in health care. We contend that this research agenda must move beyond simply distinguishing differences between racial and ethnic minority groups in terms of health outcomes, toward a research paradigm which includes community members as equal partners in the research design and implementation process, considers the influence of events occurring over the life span which later lead to the

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development of chronic disease, equally addresses the structural mechanisms underlying health inequities, and integrates the development of sustainable social policy throughout the research process.

What Can Animal Cognition Contribute to Cognitive Science?

White Paper ID 80

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Abstract: Exciting new approaches and findings in studies of cognitive processes in a variety of animals have resulted in a vibrant field of comparative cognition and learning that is poised to produce a variety of new foundational and transformational contributions to cognitive science. The study of cognition and learning in animals provides a context in which to understand human cognition and a means to examine its function and evolution that would not be possible if the only subject of cognitive science were Homo sapiens. Work in this area has already begun to have foundational influence on our understanding of cognitive systems, including visual and auditory processes, attention, working memory, spatial cognition, time perception, numerical and mathematical cognition, concept and category learning, pattern learning, tool use and motor cognition, causal learning, problem solving, social cognition, symbolic communication, associative learning, and many others. Research in comparative cognition and learning has previously been supported by the BIO directorate. That directorate no longer supports it. We believe that support for comparative research by SBE would expand both the domain and scope of cognitive science by providing a unique opportunity to develop and facilitate a unified approach to understanding cognition in human and non-human animals.

Prescriptive Decision Research: an Interdisciplinary Extension of Normative And Descriptive Decision Theiry Integrated With Decision Aiding Experience.

White Paper ID 74

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Abstract: By the 1980s, a scientific consensus had emerged that decision-aiding methods to enhance human welfare held great potential. Ingredients for such methods -- normative decision theory, descriptive cognitive research, and practical decision-aiding experience -- were available, but were not being effectively integrated or adapted, nor adequately supported by research.
The methodological deficiency largely persists to this day. Valuable cautions against cognitive flaws flourish, but an earlier vogue for applied decision theory (decision analysis) has waned, at least for now. Productive research directions are clear (Brown 1992, 2010). They include: cognitive considerations in decision aid design; empirical feedback on the effectiveness of aiding efforts; the concept of ideal person- and situation-specific prescription (interpretable decision theoretically, but approximated otherwise). However, established research programs are lacking, due to institutional (not substantive) causes. Static research infrastructures have typically limited the conduct of prescriptive research to a single discipline (such as psychology or statistics) or application (such as business or medicine). Prospective prescriptive researchers cannot plan confidently on an unconstrained, undistracted career path or on a stable supporting academic community (with a journal to publish in). Significant funding is needed to create sustainable research programs, institutions to host them, and a pool of qualified researchers.

Knowledge Development for Mental Health of Older Adults

White Paper ID 85

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Abstract: Both the U.S. Surgeon General and the President's Commission identified the mental health of older Americans as a critical public health issue for the 21st century. About one in five older adults (7.5 million) currently has a diagnosable mental disorder. This number is expected to double in the next two and one-half decades, reaching 15 million by 2030. The demands, challenges and research opportunities arising from this issue include: (1) preparing a sufficient cadre of geropsychiatric nurse researchers; (2) developing the evidence base to adequately care for the growing number of older adults with psychiatric, substance misuse, and cognitive disorders; and (3) addressing the theoretical and methodological challenges to developing this evidence base. This paper is written from a nursing perspective, but lack of preparation in geropsychiatric research and best practices cuts across all the core mental health disciplines: medicine, psychology, social work, and nursing. Broad-based psychosocial, psychiatric, neurobiological, and medical knowledge, generated by rigorous research and translated to a wide range of clinical settings, is necessary to meet current and projected mental health needs of older adults. This paper addresses selected challenges in the context of future research, beginning with the need in geropsychiatric nursing.

Understanding Standards

White Paper ID 90

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Abstract: We live in a world in which we are surrounded by standards for people, processes, practices, and products. These standards structure the sociotechnical world as well as the behavior of people in a variety of ways. Moreover, if successful, they tend to become taken-for-granted, so much so that they escape notice of both the general public and SBE scientists. Standards may be best understood as means of governance that fall (largely) somewhere between laws and social norms. Standards are often codified as texts, or embodied in physical objects. Yet, relatively little SBE research has been done on standards. This brief paper suggests some ways in which this oversight might be rectified.

Identifying the Biological Mechanisms Underlying Social Behavior

White Paper ID 153

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Abstract: Social species are so characterized because they form organizations that extend beyond the individual. There have been tremendous advances in our understanding of the links between the mind, brain, and behavior over the past decade, but the minds and brains in these analyses have been considered to be independent, isolated units. We are now able to investigate the biological mechanisms that underlie social structures, processes, and behavior and the influences between social and neural structures and processes. Such an endeavor is challenging because it necessitates the integration of multiple levels. Mapping across systems and levels (from genome to social groups and cultures) requires interdisciplinary expertise, comparative studies, innovative methods, and integrative conceptual analysis. Addressing these requirements has the potential to transform graduate education and the scientific infrastructure and analyses in the social and biological sciences.

Documentation and Analysis of Endangered Languages, Cultures, and Knowledge Systems

White Paper ID 82

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Abstract: Endangered languages, cultures, and indigenous knowledge systems present urgent challenges and rewarding opportunities to SBE sciences. Language and cultures are dying at an alarming rate, taking irretrievable chucks of the world's knowledge with them -- already one-third of the linguistic diversity of the world has vanished. Multidisciplinary and international efforts are being established, engaging scholars from numerous disciplines, e.g., anthropology, biology, linguistics, etc. NSF should lead by leveraging funding, promoting training, and seeking innovative ways to shape, to direct, and especially to integrate the cross-disciplinary trajectory of research in these interrelated areas.

Expanding Access to Administrative Data for Research in the United States

White Paper ID 112

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Abstract: We argue that the development and expansion of direct, secure access to administrative microdata should be a top priority for the NSF. Administrative data offer much larger sample sizes and have far fewer problems with attrition, non-response, and measurement error than traditional survey data sources. Administrative data are therefore critical for cutting-edge empirical research and particularly for credible public policy evaluation. Although a number of agencies have successful programs to provide access to administrative data -- most notably the Centers for Medicare and Medicaid Services -- the United States generally lags far behind other countries in making data available to researchers. We discuss the value of administrative data using examples from recent research in the United States and abroad. We then outline a plan to develop incentives for agencies to broaden data access for scientific research based on competition, transparency, and rewards for producing socially valuable scientific output.

Dirty Jobs: Fitting a Statistical Model to a Large Data Set with a Large Amount of Missing Data

White Paper ID 119

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Abstract: In this paper, we address the question of how to extract meaningful information from data sets that feature many missing values. Many researchers would argue that data such as these cannot be analyzed. However, here we outline the analysis of a two-level data set with missing values and provide preliminary results to make the case that current technology makes such research endeavors possible. Our data combines a survey of state vocational rehabilitation agencies, carried out by the Government Accountability Office (GAO), with data on individuals who are served by these agencies. The GAO data had a rate of missingness of over 30%. The individual level data, in contrast, was more than 95% complete. Modern methods of missing data analysis, specifically multiple imputation, were applied to the combined two-level data set, to compensate for the high degree of non-response in the GAO survey. We propose that this modern missing data method, while requiring rigorous data cleaning, allows us to gain useful insights. In particular, we found a significant supply-side main effect as well as cross-level interactions between agency capabilities and human capital variables.

The Management and Organization Science Puzzle: Questions from a Metaphorical Comparison of Medicine and Management

White Paper ID 212

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Abstract: Management and organizational science (MOS) has moved rapidly from an initial focus purely on practice to a current state where it relies on a pure science model. A key issue for such a young field is whether it is appropriately covering the full extent of its scholarly jurisdiction. We are responding to the call to identify grand challenge questions in the social, behavioral, and economic sciences by examining the current institutionalization of the MOS scholarly field. We do so by drawing a comparison with the medical field that reveals the dangers of the existing decoupling of practice and theory. Specifically, we metaphorically explore the question: if the MOS field were medicine, could we afford scholarship to be limited only to the realm of pure science, for example biochemistry, in the absence of clinical embeddedness? Finally, we propose questions and potential solutions to make progress towards resolving such decoupling: fostering epistemological analyses to deepen the comparison with fields such as medicine and law, targeting clinically oriented problems, mixing various sub-disciplines of management and practitioners, and fostering actual research collaboration from fields with similar practice affiliation.

Earth Stewardship: A Framework to Transform the Trajectory of Society's Relationship to the Biosphere

White Paper ID 151

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Abstract: Over the past half-century, human activities have accelerated the rates of climatic change and the degradation of Earth's life-support system. A grand challenge facing humanity is to shift toward a more sustainable relationship between society and the biosphere. More specifically, our grand challenge question is: what linkages between environment, human perceptions and actions, and institutional dynamics govern the sustainability of society and the biosphere in a globally coupled social-ecological system? Addressing this question requires societally relevant fundamental research that advances our understanding of people and nature as a coupled social-ecological system and identifies specific ways in which this understanding can be implemented. We suggest a strategy in which academic societies collaborate through interdisciplinary working groups to develop to a strategic action plan in the following steps: (1) workshops that identify and clarify the critical interdisciplinary questions, (2) engagement of academic-society membership through white papers in key journals and joint symposia, (3) workshops of academics and practitioners to redefine and implement promising strategies, and (4) workshops of academics, practitioners, and educators to develop and disseminate education and communication strategies.

Prize Good Research!

White Paper ID 257

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Abstract: We propose that rather than financing projects that have been proposed, the NSF should award prizes for research that has already been done.

NSF White Paper: A Call for a Social Science of the Past

White Paper ID 297

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Abstract: The study of the past has long been relegated to the historiographical disciplines, e.g., archaeology and history. These fields will always be at the core of a contemporary study of the past. However, in the increasingly globalized world of the 21st century, there is a growing need for the burgeoning field of heritage studies -- the social scientific study of the past. What is the value of the past in contemporary society? How do we measure the value of heritage for such important societal issues as social cohesion and economic development? These are not only academically challenging questions -- they also have real-world applications for communities, NGOs, and nations. This paper calls for a transdisciplinary research and graduate training effort at the national level and identifies some of the key areas for a comprehensive research agenda. Such work involves fields that cross over and beyond NSF directorates: e.g., anthropology, ecology, economics, geography, history, landscape architecture, legal studies, political science, public health, public policy, psychology, regional and urban planning, sociology, and landscape architecture. Thus, NSF support and leadership for research in this area would fill an important niche in academic research, graduate training, and academic connections to praxis.

An Integrated Systems Approach to Building Healthy Communities

White Paper ID 72

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Abstract: New community health models that complement and extend traditional primary care strategies must be developed and move us from an illness-oriented model of disease treatment to a wellness-oriented model of health promotion. Teams of researchers and scholars will need to partner across a broad array of disciplines and with a wide variety of community agencies to develop a new, cohesive, and multi-dimensional systems approach to prevention and management of chronic disease and disability. At Illinois we have developed an Integrated Systems Model of Healthy Communities that recognizes that effective health policies, programs, and interventions cannot be targeted at only one level of determinants or risk factors. It is questionable whether traditional disease-based approaches to health care research will be of much value in advancing our understanding of the complex interactions among the multiple levels articulated in the Integrated Systems Model. Rather, realizing our vision will require an investment in the infrastructure and resources needed to build and empower multidisciplinary teams of experts in the social and behavioral sciences, technology and computer science, informatics, social work, education, nutrition, health economics, health policy, and health disparities.

Predicting the Causes and Consequences of Human Migration

White Paper ID 305

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Abstract: Human migration has and continues to be an important force in societal change. This short white paper proposes a program to comprehensively study migration motivation and impact for use in predicting future large-scale migration processes. Impact research would focus on past and present outcomes of ethnic co-residence generated by migration. A few key variables would be emphasized that could be used in predicting impact in terms of success or failure. Projects in this program would require multidisciplinary teams of social scientists, economists, geographers, statisticians, and computer scientists.

The Relationship of American Values and Beliefs to 21st-Century Health Practice and Health Care Policy

White Paper ID 273

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Abstract: Abstract: This research explores the recent rapid changes in the health of Americans, particularly the rise in diabetes and obesity, and in the institutions charged with restoring or maintaining health. Beginning with a case report synthesized from several patients who presented to rural Arizona emergency rooms over the course of a year, this paper proposes a series of ethnographies designed to address questions raised by the occurrence of rare, highly lethal Fournier's gangrene among working poor diabetic women. Drawing subjects from a socioeconomic cross-section of Americans, researchers will observe daily life as well as patient-physician interactions and health related activities. Open-ended interviews will seek insight into beliefs and values concerning health, lifestyle, diet, obesity, and diabetes, responsibility, health care, and science. Researchers will triangulate results through interviews with significant members of respondents' health support system, including physicians, employers, case workers, and family. The results will be published as a series of essays or short reports, each addressing a different aspect of health and health care, and as a book. Exploring the nexus of values, beliefs and behaviors, this project will add fundamentally to the understanding of health and health care in the United States.

How Can We Harness Marketing Strategies to Stem the Epidemics of Obesity and Dietary-Related Chronic Diseases?

White Paper ID 40

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Abstract: Given the epidemics of obesity and dietary-related chronic diseases, this paper argues that we need to do more research in food retail outlets by creating embedded consumer behavior laboratories. The point of purchase is a critical moment in consumer behavior. Frequently, in ways people cannot readily recognize nor easily resist, they are influenced to buy and consume products that increase their risk of or exacerbate chronic diseases. Consumer behavior laboratories should be built in real- world, working retail settings to capture the influence of multiple cues and stimuli. These laboratories should develop and test strategies to encourage people to make food choices consistent with the Dietary Guidelines for Americans. Understanding the economic impact of changing diets is crucial, since ultimately it will be necessary to decrease the consumption of low-nutrient items to reduce obesity. Using technology like video cameras and smart cash registers in restaurants and supermarkets we can study how the atmospherics, displays, and promotional strategies influence choice. Consumer behavior laboratories could be a national resource for a variety of multidisciplinary investigators who would apply to use the venues to conduct experiments to optimize dietary behaviors and reduce chronic diseases. Lessons learned can inform public policy.

Consumer Financial Behavior: Integrating Disciplines to Understand Fundamental Economic Activity at the Household Level

White Paper ID 260

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Abstract: Consumer finance is an emerging area of inquiry spanning social science disciplines. The field raises significant questions about cognition, risk-taking, self-control, rational decision making, time preferences, and social theory. Arguably, researchers lacked the data, theories and methods to be able to inform society or policymakers during the credit boom of the last decade or how to respond as the Great Recession unfolded. The field of consumer finance offers potential solutions to these problems. However, current support for research in this field remains a patchwork among funders. Of greatest concern for the development of future researchers in this field is the fact that there are no systematic sources of support for the training and support of graduate

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students in consumer finance. Moreover, work in this field remains challenging to implement because it fails to correspond to current disciplinary purviews. NSF support for cross-disciplinary collaborations, training and support of future PhDs, the collection of longitudinal data at the household level, and the development of standardized mixed-methods approaches will facilitate academic studies on consumer finance. These studies will provide insights for practitioners, policymakers, and consumers themselves to potentially react to future shifts in the credit and personal finance environment.

Providing the Web of Social Science Knowledge for the Future: A Network of Social Science Data Collaboratories

White Paper ID 225

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Abstract: The evidence base of the social sciences is changing rapidly as we enter a historically unprecedented phase in the production and availability of data and other information about the social, political, and economic world. These new and abundant sources of information hold the promise of enabling social scientists to address the most significant issues facing us as a society -- from governance, health and welfare, to the environment and the economy -- if the information is harnessed appropriately. If we can gear up fast and build the research infrastructure necessary to manage effectively and make accessible the immense infusion of data, successfully provide training to a new generation of scholars who will work with these data, and tackle the substantial privacy and security issues, social science can make more dramatic progress than ever before imagined. No single university or research group is likely to be able to manage all of these tasks, so it is proposed that NSF create a major national resource -- a collaboratory of networked institutions to support a wide-range of activities that would make these tasks manageable, creating a shared resource of unparalleled value to the world of social, behavioral and economic science.

The Spatial Humanities: GIS and the Future of Humanities Scholarship

White Paper ID 163

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Abstract: Spatial humanities signifies how considerations of space, both geographical and metaphorical, are shaping innovative scholarship in the humanities, especially its sub-genre, spatial history. This scholarship often relies upon a powerful technology, geographic information systems, and its disciplinary parent geographic information science, to raise new questions about the relation of space to human behavior and social, economic, political, and cultural development. It represents a bridging of disciplines, with history, archaeology, literary studies, religious studies, and cultural studies, among others, now taking up theories and approaches formerly the domain of geography and the social sciences. It also recognizes the increasing tendency of social scientists to incorporate into their work aspects of method and approach typically associated with the humanities. In short, while the spatial humanities is first of all a project that seeks to import into the humanities research practices associated with geography and other social sciences, it is at the same time an effort to foster collaborations that will result in spatially-oriented humanities research influencing the work of scholars in political science, economics, sociology, and other cognate areas. Space is the bridge between these various disciplines, and that bridging will improve through sustained support from the NSF.

Building Agency for Teachers and Students

White Paper ID 137

Abstract: Lack of agency among teachers and students is a persistent obstacle to achieving 21st-century learning goals. Efforts to increase student achievement all too often have the unintended by-product of rote standardization which takes away the capacity teachers and students need to make informed, well-grounded decisions that reflect locally emergent issues and conditions. Thus, the need for

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research into the dimensions of how agency can best be promoted without sacrificing professional accountability. This paper seeks to start that effort by interpreting formative research conducted under existing NSF grants through the lens of existing sociological and educational models. The paper then concludes with recommended foci for further research in the field.

Analyzing Human Systems Across Time, Space, Language, and Culture

White Paper ID 216

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Abstract: Due to the rise of very large, heterogeneous collections, increasingly sophisticated multilingual services, and expanding high performance computing infrastructure, we are now in a position to begin studying 4,000 years of linguistic data from around the world, tracing change within languages, the interaction of languages, the evolution and circulation of ideas, and the patterns of human society. Language has been an impenetrable barrier -- we can reach any point on the globe in a matter of hours, but the amount of time required to master a new language remains unchanged. We can, however, now begin to work with far more languages than we could ever study, much less master. We are now in a position to pursue broader questions and to pursue these with greater rigor than would have been possible in print. A great deal of work remains to be done, however, for very large collections are not scientific corpora and need extensive processing, and many written sources do not yet lend themselves to optical character recognition. Simply scaling up existing systems to analyze millions of books poses software engineering challenges. Perhaps most important of all, we need to train a new generation of researchers who can bridge the intellectual gaps between the relevant computational methods and new research for social, behavioral, and economic sciences.

Information Technology: The Connective Tissue of Organizing

White Paper ID 301

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Abstract: This paper proposes the following challenge question for SBE research for the year 2020 and beyond: how can we advance the study of the ways information technology connects and influences organizational action from the micro (local) through to the macro (global) levels of analysis? Exploring this question requires social scientists to focus on meso-level theorizing for information technology (IT) as an organizational phenomenon. Most existing research focuses on either macro-level abstractions or micro-level behavior of IT use. This constraints the building of scientific knowledge on how today's technological capabilities are impacting our society's future. We argue that future SBE research should build a coherent theory framework for empirical investigations into the technology-organization interplay at the meso-level of analysis, where it impacts our lives. In the paper, we give examples of emerging social developments and needs that indicate the importance of building such a theory framework and suggest first steps for creating the necessary intellectual infrastructure. We conclude by pointing to some promising theoretical directions for future work.

Workforce Protection in Small Businesses

White Paper ID 84

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Abstract: The human and financial costs of work-related illnesses and injuries are a significant and persistent burden to society. The social, behavioral, and economic (SBE) sciences have played a role in reducing those costs over the years by developing management practices, workers compensation insurance systems, and government policies that seek to eliminate dangerous workplaces. Unfortunately, those systems emphasize use of technologies and practices to protect workers that are often beyond the resources of small businesses. We propose a multi-level, cross-disciplinary vision of research that places SBE at

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the center of workplace safety and health efforts. Research is needed at the social systems level to understand the social networks of small businesses and how those systems can be coordinated to better deliver safety and health assistance. That effort must be coordinated with research and development on new regulatory and insurance systems that better fit the limited capacities of small enterprises. To succeed, this vision for research must include investigation of the managerial mind and its influence on protective practices in the workplace. We must also understand how family, female, and minority ownership affects prevention practices. There is some existing capacity to execute this vision, but leadership from the SBE research community is vital.

Valuing the Commons: A Fundamental Challenge across Complex Systems

White Paper ID 313

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Abstract: The political, economic and social landscapes of the 21st century are increasingly dominated by complex, sociotechnical systems that are essential to human civilization, yet incompletely addressed with existing theory, tools, methods, and policies. Illustrative systems are found in transportation, information, finance, energy, health care, education, disaster response, and supply chains. Social, behavioral and economic sciences in the 20th Century were focused on hierarchical corporations and expanding markets – the organizational and institutional underpinnings of the industrial revolution. Twentieth-century successes were tempered by various "tragedies of the commons" (such as negative impacts on working conditions, human dignity, the environment, and developing economies). In the 21st century, increasing interdependencies and accelerating rates of change are dramatically expanding the ways in which complex "systems" shape organizations and markets. Multi-level research incorporating the systems context and systems-level policies have great transformative potential – addressing externalities and expanding how we "value the commons." This white paper highlights layers and networks of aligned (or misaligned) stakeholders, which are at the heart of these systems. Orienting social, behavioral, and economic sciences and public polices to better address stakeholders in complex systems is essential to generating new forms of value for society and mitigating catastrophic systems failures.

Why Don't People and Institutions Do What They Know They Should?

White Paper ID 34

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Abstract: I propose as a central question for the social and behavioral sciences the following topic: why do people and institutions not do things that are so obviously in their self-interest, even when they want to do so? We have numerous examples of this phenomenon, from individual behavior such as seatbelt use and medication adherence, to firm outcomes such as quality improvement or cost reduction. The ability to encourage what people know to be right is central in many policy debates, including the recent health reform discussion in the United States. I indicate three lines of inquiry as promising in understanding this question: characterizing the motivation of individuals, understanding group decision-making, and undertaking interventions.

The Importance of Cultural Heritage to Future Research in the Social, Behavioral, and Economic Sciences

White Paper ID 278

Abstract: "Cultural heritage" is a concept that has become increasingly central to the social sciences. While it has been employed in the service of identity politics, post-conflict reconciliation, historic preservation, community development, and tourism, scholars are only beginning to understand what its impact might be to our theories of society, the interpretation of the past; to positive policy decisions; and to the ethics of social scientific research. In this paper, we argue that cultural heritage merits rigorous investigation in four core

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areas of the National Science Foundation's initiatives: (1) in the documentation of cultural practices among human societies past and present; (2) in the relationship between law and society; (3) in the relationship between economic development and society; and (4) in the creation of ethical protocols for scientific research. Following on these themes, we suggest a research program for the future of cultural heritage studies.

A Challenge for the National Science Foundation: Broadening Black and Hispanic Participation in Basic Economics Research

White Paper ID 252

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Abstract: This white paper considers the low participation rate of black and Hispanic Principal Investigators (PIs) and the distribution by institution among National Science Foundation (NSF) basic economics research grants. An analysis of NSF economics grants between 1990 - 2010 show that black and Hispanic PIs received a very small share of awards and that 15 institutions received over 50% of the funds awarded. Such an outcome represents a challenge for science policy if indeed broadening participation is a serious objective. We conclude that NSF economics should: (1) aim to cultivate and sponsor research that examines the causes and consequences of black and Hispanic underrepresentation among NSF economics grantees; (2) make concerted efforts to recruit proposal reviewers and proposal review panelists from a diverse set of institutions; and (3) incentivize broad participation and racial/ethnic diversity in the basic economics research by penalizing institutions for not achieving respectable levels of racial/ethnic diversity on their economics faculties.

Rethinking Life: Astrobiology and the Future of the Social, Behavioral, and Economic Sciences

White Paper ID 280

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Abstract: Human beings have long been interested in the potential discovery of extraterrestrial life , but astrobiology is much more than this. Astrobiology addresses the definition, emergence, evolution, and future of life on Earth and in the universe, and intersects with the human exploration and exploitation of our solar system, our own deliberate evolution, and our relationship with our planet. Astrobiology is challenging our views of, and engagements with, life itself, as well as humanity's position in the universe. The science presents issues that crosscut SBES disciplines at a fundamental level. All legal, ethical, theological, and cultural systems are based on "life as we know it," and astrobiology has begun to challenge those fundamental assumptions, as well as our anthropocentrism, and our terracentrism. A truly interdisciplinary approach is needed to understand the broad implications within human and social contexts – now and in the future. We therefore ask, how will advances in astrobiology research and exploration affect humanity? and argue that it is necessary to foster an interdisciplinary community of SBES researchers who can address the human questions that astrobiology is presenting to us.

Three Research Themes

White Paper ID 15

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Abstract: I identify three areas of research that are important and have large potential payoffs. In all three areas, I focus on needs and opportunities for theoretical analyses, since these are areas and research methods with which I am familiar, without any intention to underplay the importance as well of other research inputs, including empirical and experimental work. The first, optimal taxation of capital income, is an area of steadily advancing normal science that is making significant progress. The other two, incorporating behavioral economics into equilibrium analyses and understanding systemic risk, are more foundational.

The Public Administration Genome Project

White Paper ID 285

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Abstract: This white paper is concerned with public administration (PA), which can easily involve many other disciplines. At last count, there were 87,000+ governmental units in the U.S. (with the federal government and every state counted as one each). Relatively little is known across the spectrum about these entities. They could be involved with a significant percentage of 13,000 identified problems. There is an obvious need to find a way to approach this overall problem solving situation on a different scale and with a different scientific schema then in the past. The fundamental and important challenge question for the SBE 2020 visioning exercise thus is: what could this scale/ schema be? One scientific, large-sized schema to use as an analogy is the Human Genome Project (HGP). Starting in the year 2000, much effort has been exerted on a similar long term endeavor known as the Public Administration Genome Project (PAGP). It is proposed that the further development of the PAGP will be both foundational and transformative to SBE research; will increase the educational capacity of its developers and users; and with the required sizeable scale up, will create a need for new types of hardware and software infrastructure.

New Paradigms in Native American Social and Behavioral Intervention Research

White Paper ID 87

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Abstract: In 2008, Harvard University recognized the Choctaw Nation of Oklahoma with High Honors for its domestic violence intervention program, Project Falvmmichi. "Falvmmichi" is a Choctaw word that means, "to reclaim." Thus the goal of Falvmmichi is to reclaim their youth from the pervasive cycle of domestic violence. Currently, over 300 teen mentors present curriculum on a monthly basis to 73 second grade classrooms within the Choctaw Nation. Evaluations of the program have shown remarkable initial success in the six years since its inception. This white paper discusses the standing questions in the research field resultant from the success of Falvmmichi. In addition, applicable challenge questions to the research community, the capacity to be created by such research, potential methodological approaches, the range of disciplines, and implications for future research are presented. Considering the growing prominence of the Native American presence on our cultural landscape and the paucity of relevant and empathic research around this ethnocultural group, social and behavioral issues in Native American communities are an uncultivated green field of research opportunity.

What About Social Equity: The Challenge to Urban Sustainability Planning

White Paper ID 226

Abstract: Social equity goals are rarely integrated into sustainability plans aimed at enhancing economic and ecological components of urban areas. Thus, the standing question in the fields of urban planning and urban ecology is how to change the calculus of urban planning so that social equities are incorporated into the future development of neighborhoods, cities, and regions. The fundamental question is: how can new approaches to city planning

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simultaneously addresses historical social inequities and ecological degradation within a market driven context? This points to articulating institutional reform and political strategies for more the development and implementation of robust sustainability plans.

A Research Agenda for Development Economics

White Paper ID 3098

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Abstract: Development economics has grown tremendously in the last fifteen years. It can continue to grow and improve in the next decades by focusing on three areas: First, revitalizing the tradition of applied theory which transformed development economics in the 1980s and 1990s, by giving us a better understanding of how poverty shapes individual options. A new wave of applied theoretical work is needed, to incorporate recent empirical findings that have revealed the limits of the earlier theoretical framework. Second, continue expanding and improving empirical work, in particular experimental work. More ambitious, potentially more expensive experiments should be conducted. Third, expanding theoretical and empirical work on the aggregate consequences of micro-level distortions, themselves identified by the new theoretical and the empirical work to be done under the first and second areas of focus.

The Debt Society: College and Beyond

White Paper ID 30

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Abstract: Americans are increasingly financing their lives with debt. The widespread availability of debt is a recent development and one in part intended to make credit available as a benefit to less-advantaged members of society previously denied this resource. Important questions are emerging, however, about the advantages and risks of widespread mortgaging of the future to finance the present. Americans begin taking on debt at an increasingly early age with borrowing to finance college. It is important to know to what extent, and for whom, is debt-based financing of college resulting in higher educational attainment? Circumstantially, educational debt is rising at the same time as completion rates are declining, suggesting that the strategy of funding college for all through personal debt is not an overwhelming success. Possible longer-term consequences of debt are even less well understood. Will undergraduate debt affect continuation rates to graduate school? Will carrying significant debt into early adulthood delay marriage, childbearing, and home ownership? What health consequences might result from the ongoing stress of carrying debt starting even before adulthood? Answers to these questions will necessitate the collection of more detailed data on debt and contributions from a range of social science disciplines.

Future Research in the Social, Behavioural, and Economic Sciences: Addressing Data Needs

White Paper ID 181

Abstract: This paper addresses the link between future research challenges and the data infrastructure required to address these challenges. It draws on a wide consultation held with the UK research community in the social, behavioural, and economic sciences undertaken in 2009 to inform the strategic development of such resources. It stresses the importance of renewed efforts to

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improve access to existing data on a global basis and for further work to explore the potential research value of new forms of data for research purposes.

A Challenge Question: Understanding, Analysis, and Management of Catastrophic Risks

White Paper ID 143

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Abstract: This paper proposes a long-term SBE research focus on catastrophic risk and fundamental uncertainty about large-impact, low probability events, the human behavior they (and their anticipation) triggers, and the substantially unpredictable consequences of their interaction with that behavior. Current paradigms in SBE sciences provide a foundation, yet remain still largely inadequate, for analysis of the complex systems that evolve around and in response to such events and reactions. The paper argues that better analyses, predictions, and prescriptions in such circumstances can arise from collaboration among SBE disciplines focused on this core issue, and points to some directions relevant to that analysis in several core SBE disciplines, including areas of collaboration with natural scientists (coupled natural-human systems). In particular, collaboration among economists, sociologists, psychologists, and geographers, each able to approach the complex issues from a different perspective, is apt to be most fruitful in clarifying both the science behind these issues and appropriate policy responses to the problems that they pose. The paper briefly touches on a number of new directions in each of these SBE disciplines, indicating how they might contribute to a better understanding of this encompassing challenge to the social, behavioral, and economic sciences.

From District to Desktop: Making the Most of Broadband in Schools: A White Paper

White Paper ID 32

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Abstract: For Americans to engage in a global information society, it is critical that they have access to high-speed, high-bandwidth Internet, meaning broadband. Network connectivity opens up a wealth of possibilities to K-12 educators. While it has the potential to result in fundamental changes in teaching methods, it can definitely be used to enhance already effective teaching methods. However, schools must have confidence in their network infrastructure before network connectivity will be integrated into the classroom. Networks must be reliable and quick, and, if they do not function, as expected and technical support is not readily available, then educators will not use them. Schools face challenges to the integration of broadband in teaching and learning in the areas of access, skills, policy, and motivation. Last mile support is essential and all stakeholders must work together to address the main issues facing the improvement of broadband in schools. A solution to these situations is on-site support to streamline and enable effective use of broadband-enabled technology. For most schools, the school librarian, in their roles as school leaders, can expertly direct this last mile implementation by providing the technology coordination, support, and leadership necessary to address access issues from desktop to district.

From Paper to Pixel: Digital Textbooks in Schools: A White Paper

White Paper ID 33

Abstract: Digital textbooks will soon be part of every classroom in the United States. This trend accompanies an imperative for schools to facilitate 21st-century learning in which educators prepare students to learn and live productively in a global society where accurate and current information is a meaningful part of everyday learning. As technology and the Internet have gained presence in classrooms, instructional materials and activities have

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become digitally rich. The use of digital textbooks is rapidly gaining ground in education. While colleges and universities have moved headlong into digital textbooks as a means to reduce costs for students, K-12 education is venturing cautiously, but steadily, into using digital textbooks. State laws, many of which have been rewritten to include digital content as an acceptable use of state textbook funding, will serve as catalysts that spur the transition to digital textbooks. School librarians can provide school-wide leadership to assist students, teachers, and parent concerns when transitioning to digital textbooks. Working in collaboration with teachers, school librarians promote comprehension through questioning, clarifying, seeking meaning, and discussion. Digital textbooks may represent a way to continue advocacy for the importance of reading as well as for the school librarian's leadership role in technology integration.

Using New Data Analysis Techniques to Understand Information Flows

White Paper ID 200

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Abstract: Information flows motivate key questions in the major social sciences. Yet scholars have had great difficulties in studying them directly. The movement of social activity to the Internet means that it is now possible to study information flows directly in a much more systematic fashion than before -- data on many forms of social interaction is readily available in machine-readable format. Yet properly studying this new data will require new tools and new techniques. This white paper proposes a two-stage program to develop new tools in conjunction with pilot initiatives studying information flows, and then apply them more broadly. It then outlines how these methods and data might be applied to three major problems spanning different social sciences -- collective cognition, frames and mobilization, and political polarization -- and concludes by discussing the policy benefits of better analysis.

Gender Analysis and Women's Rights: A Critical Research Need

White Paper ID 178

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Abstract: Gender used analytically as part of understanding social, behavioral, and economic relations is a tool that can advance theory and build our understanding of critical empirical relationships involved in some of the most important problems of our era. Gender is a social structure, interactional process, and political discourse relevant across all dimensions of society, not limited to individual behavior and experiences, which is where prior research has concentrated. Rather than merely funding a special area of gender studies, SBE should challenge scholars in all its fields to take more cognizance of human diversity in their research, as the biomedical field has done, but also to reveal the importance of gender relations as a structural context for all people.

Network Theory and Application: Creating a Long Term Human Research (NSF LTHR) System

White Paper ID 316

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Abstract: Development of an in-depth understanding of the evolution of interconnected human activities -- based on empirical investigation -- represents a major frontier of science. Network science has already shown its value across disciplinary boundaries in many scientific fields, but collective understanding of the complex human system remains in a nascent stage. The life sciences have successfully explored the network concept, and its potential for similar revolutionary advances in the SBE is high. Applying network theory and analysis using the best science is critically needed now; solutions are needed for two interdependent, global challenges: (1) vulnerability of specific human populations and (2) continued human-environment conflict in human-influenced spaces. The fundamental question is: can human networks and their evolution be understood to benefit society, especially vulnerable populations and human-influenced spaces most at risk of negative consequences? The challenge to the NSF/SBE is to take a strategic approach to develop infrastructure to appropriately take advantage of network science, theory and knowledge generated through application for widespread societal and environmental benefit, and simultaneously ensure that the most-vulnerable populations and human-influenced spaces are among the major beneficiaries. Development of a Long Term Human Research (LTHR) system in the US, and ultimately globally, represents one unifying approach.

Questions about the Future of the International Economy

White Paper ID 133

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Abstract: The problems that stand out are: (1) Assuming the center of gravity of the global economic system is moving towards Asia and the emerging market countries more generally, what are the implications for the management of the international economy, and for the future behavior of the international economy? (2) What can/should be done to try to channel this process in a constructive direction? (3) What are the political implications of this shift? (4) What are the factors that could derail this process and what would be the political and economic implications of such a derailing? (5) The futures of China and India are critical to this process. In addition, (6) the information explosion/Google/Facebook/government censorship of their activities in many countries, is a critical and little-studied issue. (7) Demography and demographic trends. It's hard to believe that Russia, Japan, China, Europe are simply going to stand by while their countries and economies become smaller and relatively less significant, as a result of demographic trends. (8) The energy issue, including the potential role of nuclear power and all its geopolitical ramifications, is not going away.

Metrology for the Social, Behavioral, and Economic Sciences

White Paper ID 36

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Abstract: A metrological infrastructure for the social, behavioral, and economic sciences has foundational and transformative potentials relating to education, health care, human and natural resource management, organizational performance assessment, and the economy at large. The traceability of universally uniform metrics to reference standard metrics is a taken-for-granted essential component of the infrastructure of the natural sciences and engineering. Advanced measurement methods and models capable of supporting similar metrics, standards, and traceability for intangible forms of capital have been available for decades but have yet to be implemented in ways that take full advantage of their capacities. The economy, education, health care reform, and the environment are all now top national priorities. There is nothing more essential to succeeding in these efforts than the quality of the measures we develop and deploy. Even so, few, if any, of these efforts are taking systematic advantage of longstanding, proven measurement technologies that may be

crucial to the scientific and economic successes we seek. Bringing these technologies to the attention of the academic and business communities for use, further testing, and development in new directions is an area of critical national need.

Challenging Potentials of Technological mediated Knowledge Production

White Paper ID 283

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Abstract: Social science research regarding the effects of new information technology has often been retrospective, offering insight about applications to which these technologies have already been applied or the changes to practice and knowledge that has arisen. Research continues to ask how these new technologies will be incorporated into modes of knowledge production. This question of the challenging potential impacts needs to be expanded to ask what potentials for challenging the current situation exist within these technologies as well. The retrospective analysis offers insight into the roles that these technologies have played but does not increase the potential of information technologies to serve as an avenue for reevaluating currently dominant practices in knowledge production. Through forward-looking research on and use of new technologies could create new spaces from which to evaluate and improve existing institutions. The production of knowledge within most scientific disciplines demands maintenance of protocols that complicates experimentation with the mode of production. The social, behavioral, and economic sciences, wherein the study of the mode is often a central topic, has an opportunity to develop an experimental approach to modes of knowledge production through the integration of technologies intentionally as a fulcrum for movement of long staid traditions.

Earth in Crisis? A Forward-Looking Agenda for Research on the Cultural Causes and Consequences of Climate Change 2010-2020 and Beyond

White Paper ID 274

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Abstract: A catastrophic collision of human beings and the natural world seems well underway, in a new century characterized by problems of climate change, food insecurity, water shortages, resource wars, economic instability, climate refugees, global pandemics, and deteriorating governance. Climate change aggravates all of these and confirms their global interrelatedness. The Foundation should respond by funding research on the underlying causes and consequences of climate change in a two-pronged program aimed at understanding: (1) the changing cultural/institutional engines of economic accumulation and its negative social and environmental externalities; and (2) responses from civil society, especially the social movements and forum politics of climate change activism, with focus on the origins, developmental trajectory, animating visions, tactics/strategies, and growth or decline of these movements. Conceptual tools for understanding the complex interactions among social movements, civil societies, national governments, and global bodies include the notions of modern social imaginaries (Widick) and political cultures of opposition and resistance (Foran). Studying the cultural causes of climate change and the institutional forces behind resistance to future-oriented climate reform are crucial starting points for this research, which could with NSF guidance contribute much to an understanding of climate change movements, and indirectly toward economic, social, and ecological sustainability.

Improving the Capability of SBE to Support Behavioral Research with Diverse Species through Shared Review in the Office of Multidisciplinary Activities

White Paper ID 293

Abstract: Contemporary behavioral research is more species-diverse than the current programmatic structure of SBE recognizes. A program for integrative comparative studies within the Office of Multidisciplinary Activities of SBE would support a vibrantly interdisciplinary review process where the research topic, rather than species, guides where research proposals are handled. The implications for future research within and across the disciplines is profound: including studies with other species in the research portfolios of programs with

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an historically exclusively human focus provides NSF with an integrative conceptual framework to unite humans with the rest of the living world. This can transform our view of human capabilities and of our place in the world.

On behalf of the American Society of Primatologists

Using Longitudinal Data Systems to Reexamine Timeless Problems

White Paper ID 83

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Abstract: This is a proposed research approach that attempts to shed light on the cyclical nature of education problems and our inability to adequately address these problems. We continually examine bits and pieces of the education process to understand the whole. This paper suggests that the use of longitudinal data systems be utilized as a holistic approach to reexamine issues regarding the degree of efficiency of our schools. There are many time related events that should be examined longitudinally given that learning itself is a time bound process. Specifically, addressing the dropout problem through intervention strategies that are implemented at the wrong time will never be successful. Using longitudinal data systems with complementary analysis techniques, such as survival analysis, may help resolve some of the questions that have plagued the American education system for the past century.

Meeting National Needs through the Social, Behavioral, and Economic Sciences

White Paper ID 256

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Abstract: Answering the question of relevance is the grand challenge facing the human sciences. We offer the following suggestions for future directions for the Directorate for Social, Behavioral, and Economic Sciences at the National Science Foundation: (1) treat accountability broadly construed as a topic of scientific research, (2) support research in the human sciences that is primarily oriented toward relevance and timeliness rather than methodological rigor, (3) promote the development of a new community of practice in the philosophy of science policy to complement the science of science policy, (4) support research into the nature of interdisciplinarity, (5) highlight SBE's status as the broader impacts directorate within the Foundation.

Predictive Game Theory

White Paper ID 20

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Abstract: Game theory is used in a variety of field inside and outside of social science. The standard methodology is to write down a description of the game and characterize its Nash or subgame perfect equilibria, but this is only sometimes a good approximation of observed behavior. The goal of predictive game theory is to develop models that better predict actual behavior in the field and in the lab. Core questions include: What determines people's behavior the

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first time they play an unfamiliar game? How do people update their play based on their observations? What sorts of theories of mind, if any, are commonly used to guide play, and what do people think about the objective and rationality of their opponents? How do people think about games with a very large number of actions -- what sort of pruning is involved? When will play resemble an equilibrium of the game, and which equilibrium will tend to emerge? Similarly, in a decentralized matching market, when will play converge to a stable outcome, and which one? To develop answers, researchers will need to combine insights from behavioral economics and psychology.

The Grand Challenges of Personality and Individual Differences for Social, Behavioral, and Economic Science

White Paper ID 38

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On behalf of the Association for Research in Personality

Abstract: Individuals respond differently to social situations, economic circumstances, and physical environments, with important consequences for physical and mental health, occupational attainment, economic well-being, community involvement, and mortality itself. The key questions in the psychological study of personality and individual differences are: What are the primary dimensions of personality and ability how can they best be measured? What are the origins of these individual differences? What are the psychological processes that underlie individual differences in personality? To what degree and in what ways is personality stable, variable, and changeable across the lifespan? What are the behavioral implications of personality and how do these implications vary with situational circumstances? What are the long-term implications of personality for important life outcomes and how do these implications vary according to the nature of physical, social and cultural environment? Personality psychology is a hub discipline that stands at the crossroads of social psychology and economics, and also cognitive science, developmental psychology, health psychology, and biology. The key questions of personality psychology thus are both foundational and potentially transformative of broad areas of social science.

The Impact of Global Connectedness on Urban Areas

White Paper ID 106

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Abstract: Wayne State University faculty in the social, behavioral, and economic (SBE) sciences propose that the NSF SBE division fund primarily individual grants aimed at understanding the impact of global connectedness on urban areas. One example is the vulnerability of urban areas to weapons of mass destruction (WMD), made easier by the increasing permeability of states. Investigators in this area strive to understand, predict and ameliorate the behaviors and actions of individuals, groups, and nations intent on acquiring, building, and using WMD. Another example of the impact of global connectedness on urban areas is how the flow of socioeconomic and political ideas, businesses, technology, and labor forces cross national boundaries and impact societal processes and functions. Investigators in this area study topics including how individuals and societies impacted by global changes such as multinational corporations, technology, and migrant work forces are affected, socially, economically, politically, and the response of individuals, societies and governments.

Exploring Intergenerational Influences on First-Generation College Students

White Paper ID 206

Abstract: First-generation students are currently underrepresented in higher education and in the science, technology, engineering, and mathematics (STEM) fields. While extensive research has been conducted on first-generation college students, little is known about how other individuals of the previous generation influence these students' college aspirations, enrollments, choice of major, and

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educational outcomes. This paper briefly outlines potential research questions and methodologies that would allow for first-generation students to be disaggregated by intergenerational influences, as well as further understandings of these types of students as family structures become increasingly complex. The fields of education, sociology, economics, and demography are offered as potential disciplines from which to study this line of inquiry. Such research is expected to further understandings of first-generation students, as well as create programs and policies that increase college attendance, entrance into STEM fields, and degree attainment through non-traditional avenues for these types of students.

Bridging Molecular and Paleontological Evidence for the Origin and Diversification of Major Primate Groups

White Paper ID 227

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Abstract: Our understanding of the temporal and spatial aspects of primate and human evolution has improved significantly over the last few decades, but major disagreements between the fields of molecular anthropology and paleoanthropology persist. The only way to move many of these debates forward is through additional high-risk paleontological research in targeted biogeographic areas and time periods. The discovery of additional fossils will directly advance our knowledge of primate evolution and biogeography as well as provide new data points for future molecular analyses. Thus, paleoanthropological field work provides the opportunity to test a series of hypotheses regarding the origin and diversification of major primate groups in deep time, and such increased paleontological research will help refine molecular estimates either by substantiating the molecular clock or by lending support to the notion that the molecular clock is not accurate in certain cases.

Corruption and State Fragility: A Call for a Micro-level Research Program

White Paper ID 96

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Abstract: This white paper recommends the adoption of a research program dedicated to understanding the relationship between corruption and state fragility around the world. The program would be characterized by a micro-level, mechanism-based approach. In particular, it would concentrate on the link between experiences with or perceptions of corruption and a set of specific, individual-level activities which either erode or enhance the stability of the state. The notions of coercive voice, noncoercive voice, and exit are presented in the paper as a means by which to organize the types of behavioral reactions which corruption may induce. By framing analysis at the individual-level, the research program would represent a useful complement to the extant literature on state failure, which has principally drawn its inferences about the role of different risk factors from analyses conducted at the cross-national level. Moreover, by focusing on the behavioral consequences of corruption, the program would greatly extend existing public opinion work on the consequences of corruption, which has mostly limited itself to exploring the attitudinal implications of corruption exposure.

Long-Range Research Priorities in Economics, Finance, and the Behavioral Sciences

White Paper ID 37

Abstract: In macroeconomic theory, I suggest supporting agent-based models of decentralized market systems with sophisticated financial sectors, as well as theoretical research that provides the analytical foundation for the phenomena discovered through agent-based models. In rational choice and game theory, I suggest increasing support for laboratory and field experiments in choice and strategic interaction, as well as support for analytical modeling of the

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phenomena discovered through experimental interventions. Finally, I urge the formation of a transdisciplinary department of NSF devoted to peer reviewed support of transdisciplinary work, with advisors drawn from all the behavioral sciences.

Toward a New Generation of Tools and Technologies for Social Sciences: The Intertwined Role of the Humanities/Social Sciences and Engineering

White Paper ID 279

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Abstract: The current state of affairs of information technologies for social, behavioral, and economic sciences (SBE) research requires a new generation of tools, technologies, and infrastructure. In this new iteration, we must add a humanistic awareness to the existing computational systems. The increased complexity of SBE research requires advanced data processing tools capable of a deep understanding of the data sets. The new generation of information technologies must incorporate new dimensions such as "perception" and "perspective" in addition to "content." Specifically, the community should go beyond the current approach and thinking by embracing a new initiative of high-level interdisciplinary research. This requires the exploration and integration of humanistic social science input into the development of a new generation of information technology tools and infrastructure. This white paper draws attention to the imperative need for the creation of new information technology centers capable of addressing the current challenges facing SBE research. Examples in support of such an initiative are provided herein.

Bounded Rationality in Markets and Government

White Paper ID 183

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Abstract: The economic events of the past 15 years and recent trends in economic research create an opportunity for a productive push of research on limited rationality in markets and government. The great asset gyrations in technology stocks and housing prices are hard to reconcile with extreme rationality in all market participants. Appropriate policies and institutions must reflect the limited rationality of both the market and the public sector. Economists have begun to develop the tools needed to allow more psychological realism in our models, and that realism seems likely to be necessary both in understanding extreme market phenomena and in formulating wise policies. Much of behavioral economics has focused on human decision making essentially in isolation, but the economists comparative advantage has always been in the understanding of markets. The highest returns would seem to be in funding bounded rationality in aggregates, like markets or governments. One important step is to understand how erroneous beliefs are propagated or minimized by market settings. It seems just as necessary to understand how psychological frailty interacts with politics and regulation. The painful events of the past 15 years only underscore the importance of economic research.

Defining and Redefining NSF Funding for Linguistics

White Paper ID 258

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Abstract: There are three domains in which linguistics has an important role to play in American society, roles which merit NSF's continual support. These domains involve, first of all, fundamental scientific research, in part (but only in part) in alliance with collaborators in psychology, biology, and computer science; second, a better understanding of how the languages of the United States and abroad are evolving under the impact of racial, social, and economic differentiation, of immigration, and accelerating globalization, along with a better understanding of how language knowledge and use plays a vital role in finding solutions to economic and social challenges; and third, issues of

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technical translation, which is to say, of harnessing of linguistic research in order to create and to improve technology necessary for the economic growth of the country.

SBE 2020: The Impact of the Empirical Implications of Theoretical Models (EITM) in the Social, Behavioral and Economics Sciences

White Paper ID 187

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Abstract: On October 29, 2009, the Political Science Program of the National Science Foundation NSF) convened a workshop (SES-0956812) to evaluate the progress that the Empirical Implications of Theoretical Models (EITM) initiative -- the program to unify formal and empirical analysis -- had made since it was first introduced in 2002. More importantly, given that funding for all EITM initiatives end in the summer of 2010, it was deemed appropriate to determine whether to make EITM a continuing focus of the Political Science Program at NSF and to consider whether to extend the initiative to other social science disciplines. The interdisciplinary workshop participants found the EITM initiative to be one of the best things NSF has done and that it has been money well spent. They unanimously agreed that the EITM initiative should continue within political science but also expand to other social science disciplines. In their commentaries, Workshop participants identified the following achievements of the EITM initiative and its goals for the upcoming years. A copy of the 2010 report can be found at the following: (http://www.uh.edu/hcpp/EITMWorkshopREPORTFINAL.pdf). In this white paper, we highlight the EITM motivation, training and integration challenges, and future initiatives suitable for transforming the social sciences by 2020.

A Self-Organizing Ontology for Surveillance of Disease Outbreaks

White Paper ID 300

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Abstract: A vast amount of real-time information about infectious disease outbreaks is found in various forms of Internet-based data streams. However, there is concern that as this volume of information increases, social networking will give consumers an ability to quickly spread information on outbreaks which may be false, resulting in mass panic before health authorities have had an opportunity to verify reports. This paper proposes a research effort to address the flow and growth of disease surveillance using the Internet. It builds initially on an infrastructure developed by the International Society for Infectious Diseases and introduces a unique self-organizing ontology that can be used to increase the relevance of disease outbreak reports and to classify outbreaks as they evolve in real time. Techniques for understanding how to effectively exploit consumer behavior in disease surveillance are still at their initial stages and need to be generalized at the level of academic research. Further inquiry into this research area may eventually be applied to prevention of information overload in international surveillance systems, minimizing global health security threats.

The Economics of Digitization: An Agenda for NSF

White Paper ID 73

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Abstract: This agenda evaluates the consequences of digitization as well as the impact of alternative policies governing the creation and use of digital information. This agenda focuses especially on the development of a research community to investigate the economics of digitization, to analyze the governance of intellectual property in this sector, particularly through copyright, and to pioneer approaches to measuring the economic activity related to digitization. We ask the NSF to: establish a theoretically grounded empirical research tradition on the economic consequences of digitization, with emphasis on governance issues, such as those around the redesign of copyright; encourage high-quality high-impact research that significantly reshapes academic and policy evaluation of the consequences of digitization, with an emphasis on issues

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grounded in measurement; establish a research community with a recognizable identity and regularized interactions in order to establish consistent research norms, and facilitate cumulative research across this community, and enhance its impact on related fields and policy; establish a data infrastructure for cumulative, transparent, and high-quality research and the ability to translate that research for policy evaluation.

The Web of Linked Data: Realizing the Potential for the Social Sciences

White Paper ID 186

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Abstract: The Linked Data Web holds great promise for social science researchers, enabling efficient discovery of data and increasing the ease with which disparate data sets can be merged. Further, quantitative data sources can be easily connected with non-quantitative resources such as research papers. However, this vision will not be realized if best practice in documenting social science data is not combined with the use of the new technologies. The key to realizing the transformative potential of the Linked Data Web for SBE sciences is collaboration among technologists and data managers and producers, based on the emerging standard metadata models used for quantitative SBE data. The most prominent of these is the Data Documentation Initiative (DDI). If these models can be realized as standard ontologies for the publication of research data as Linked Data, then the wealth of SBE data found in data archives and in government organizations become discoverable and available to create new knowledge. Without such standard ontologies, the creation of generic tools for working with quantitative Linked Data will not be possible, and we will fail to realize the potential of the technology for the SBE sciences.

Using Historical GIS to Understand Space and Time In the Social, Behavioural, and Economic Sciences: A White Paper for the NSF

White Paper ID 78

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Abstract: The importance of space and time to research within and across a wide range of disciplines has long been recognised. Continuing this tradition, in its call for visionary white papers NSF states, "The landscape is vast and complex, stretching across temporal and spatial dimensions and multiple levels of analysis. . . in a dynamic and fragmented yet interconnected world." Historical geographical information systems (HGIS) have the potential to create truly interdisciplinary understanding of spatio-temporal processes and the connections and disruptions between them across multiple scales. As a method, HGIS is proving increasingly effective in exploiting space and time, place, and period, drawing upon a wide variety of quantitative and qualitative sources. HGIS has gained practitioners in many disciplines, including geography, political science, history, economics, sociology, and environmental history. In these fields and others, it is generating cross-disciplinary research. Funding research and increasing capacity in this field will result in a step change in our understanding, not just of the past but of how societies and economies have developed to reach their current situation.

Grand Challenges in Economics: What Is the Right Amount of Choice?

White Paper ID 27

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Abstract: A fundamental tenet of neoclassical economics is that more choice is good. More choices expand the possibilities set and can only lead to individuals finding outcomes that they prefer. Many econometric models of choice, such as the standard logit choice model, by definition have error structures that show an increase in welfare as choices increase. Yet what has been apparent to lay people for many years has become clear to economists as well in recent years: too much choice can reduce welfare. A wide variety of papers in behavioral economics has shown how increasing the size of choice sets can reduce participation in the market. Other papers have shown consumers choosing clearly dominated options in choice environments, particularly the elderly who may face cognitive

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challenges in making appropriate choices. For example, in recent work with Jason Abaluck, I have found clear evidence that the substantial majority elders choosing prescription drug plans under the Medicare Part D plan do not choose the cost minimizing option. This existing literature suffers, however, from the standard problem with empirical work in behavioral economics: it clearly documents a positive anomaly, but leaves us with little normative guidance as to the policy implications. This research suggests that in a variety of contexts we may want to limit choice but how much? And, if choice is to be limited, should it be limited through simply reducing the number of options, or by restricting the space set in which suppliers can compete to provide a more organized choice framework?

The Emerging Crisis in Sampling of Household Populations

White Paper ID 231

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Abstract: It is rapidly becoming impractical to achieve, at reasonable cost, fully representative samples of the general population, whether at the local or national level in the United States. Face-to-face surveys using area-probability sampling on a national scale are far beyond the financial reach of most researchers or the capabilities of most survey organizations. The increasing difficulties and costs of gathering data from a representative sample of some known population threatens the external validity of sample surveys across the social sciences, whether for basic or applied research, and threatens NSF's and many other federal research budgets and the policies that rely on survey results. New methods of sampling are being devised and used, but none is thus far able to offer near-complete coverage along with acceptable rates of response at a reasonable cost. Resolving this coming crisis will require new methodological and statistical research that exploits newly available communication and database technologies and questions some of the fundamental assumptions that are commonly accepted in survey sampling. This paper is a call for a new, focused emphasis from NSF's Social, Behavioral and Economic Sciences Directorate on resolving the sampling crisis in these fields in the coming decade.

The Empathetic Youth Culture: Political Socialization, Value Affiliation, and Transnational Identity

White Paper ID 167

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Abstract: The empathetic youth culture is a force of international transformation and provides diverse opportunities for different manifestations of political realities. This multifaceted proposal focuses on studying the patterns of youth interactions among constructs of political socialization, value affiliation, and transnational identity across borders. The empathetic youth culture is not confined to territorial and tribal boundaries. Youth have the capacity to detribalize, foster global belonging, and support a common human narrative. Youth's innovative spirit develops unconventional means to transmit empathetic messages and values, which are present within the interactions of these constructs. This proposed research opportunity enables international scholars from diverse disciplines to study youth as a unified population. This approach will change the foundation of education, government, economic and social practices.

A Synthesis Center for the Social, Behavioral, and Economic Sciences

White Paper ID 311

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Abstract: Synthesis, the integration of data, concepts and theories across disparate disciplines, is a powerful instrument for advancing knowledge and addressing complex societal problems. Synthesis is essential today because the intellectual and practical problems that confront us, including the socio-environmental dynamics of climate change, political instability and terrorism, macro-economic turmoil, and the diverse challenges of global health, transcend disciplines, scales of organization, and conventional distinctions between basic

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and applied research. Rich resources of data are available for analysis, but our sciences lack the theories, tools, organizations, cultures, and institutional arrangements to explore them. To achieve synthesis, advance the human sciences, and contribute to solving vexing societal problems will require investment in a center and associated computational infrastructure, education and training, and realignments of collaborations and cultures.

Increasing the Contribution of Older Americans to the Economy

White Paper ID 149

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Abstract: With increasing life expectancy, all developed countries are facing a demographic crunch of decreased percentage of the population in the labor force. Research is needed on how to motivate older Americans to work longer, and how to take full advantage of their unique strengths.

Linguistic Theory as an Integral Part of SBE's Vision for the Language Sciences

White Paper ID 248

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Abstract: SBE 2020's vision should integrate linguistic theory to help guide the wave of data collection efforts that are currently sweeping the language sciences: linguistics, psycholinguistics, neurolinguistics, and computational linguistics. Interdisciplinary work with semanticists, psychologists, ontology-builders, and brain-scanning researchers will unlock new cycles of transformative scientific work.

Making Drill Down Analysis of the Economy a Reality

White Paper ID 230

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Abstract: To address core questions in social science, analysts need to be able to drill down from key aggregates (as examples, economic indicators like productivity, job creation, and unemployment) to the person and business level with rich contextual information about personal and business characteristics. Such drill down capability needs to be accessible to the social science research and policy communities without jeopardizing the privacy and confidentiality of person- and business-level data. Much progress has already been made, but there are significant bureaucratic, legal, and methodological challenges to achieve the vision of drill down analysis.

Research Needed for Efficient Development and Evaluation of Methods for Transferring Diagnostic Practices to the Clinic

White Paper ID 310

Abstract: In many fields professional decision makers must assess the present, uncertain situation and categorize it, with different actions depending on those categories. Often it is well understood how to use the information optimally to diagnose the situation, but the individuals in the distributed operational contexts do not diagnose in this way. Often it is well understood how to support people's diagnostic reasoning with information or with diagnostic aids, but those aids are not adopted into the work patterns in the various work sites.

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Resistance to adoption of optimal diagnostic processes may be attributed to system complexity, individuals' habits of diagnosis, and the stability and inertia due to mutually reinforcing relationships among different actors, procedures, and information systems within a situation. The dissemination of more accurate diagnosis practices to all diagnosers in all situations must overcome these and other sources of resistance. Research methods for producing and testing implementation plans are coarse and expensive, and thus slow and inadequate. The scientific challenge is to improve the methodologies for discovering, selecting, and evaluating effective ways to disseminate the best diagnostic practices to all operational contexts.

Research to Understand and Improve the Exercise of Diagnostic Reasoning

White Paper ID 253

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Abstract: In many fields professional decision makers must "diagnose" -- assess the present, uncertain situation and categorize it -- with different actions depending on those categories. Errors of diagnosis are common, and consequential. Research can identify both the relevant information for the categorization and the optimal rules or concepts for combining that information, but frequently the information is not used in the recommended way. There is need for research on how people comprehend relevant information, the effective ways of using diagnostic information, and how their operational setting can be designed to offer the best support (information, and task design) for their diagnostic reasoning. Research progress on diagnosis would be applicable to medical, economic, industrial, military, intelligence, and other domains in which assessments of the situation must be made using incomplete and imperfect information.

Modeling and Measuring Systemic Risk

White Paper ID 298

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Abstract: An important challenge worthy of NSF support is to quantify systemic financial risk. There are at least three major components to this challenge: modeling, measurement, and data accessibility. Progress on this challenge will require extending existing research in many directions and will require collaboration between economists, statisticians, decision theorists, sociologists, psychologists, and neuroscientists.

Future Directions for Immigration Research

White Paper ID 50

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Abstract: How does the international migration of talent affect the creation of knowledge, the organization of work, and the rate of economic growth across nations? In recent decades, much of the intellectual firepower in research on immigration has been aimed at estimating the impact of the inflow of low-skilled foreign labor on the economic well being of native-born workers in the United States and other high income countries. For the United States, at least, it is not at all clear that low-skilled immigration matters very much for national

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welfare. In coming decades, it is how the world allocates skilled labor that will help determine which countries advance economically and which do not. Currently, governments are setting immigration policy on skilled labor flows largely in the dark. The literature has yet to produce compelling empirical evidence on the costs and benefits of skilled migration for either origin or destination countries. Future research on immigration should focus on the empirical analysis of how the inflow of skilled foreign labor affects productivity growth and innovation in receiving countries and how the outflow of talent affects prospects for growth and development in sending countries. Sound empirical analysis requires exploiting natural experiments or conducting experiments in the field. Recent events suggest prospects are favorable on both fronts.

Developing a Skills-based Agenda for New Human Capital Research

White Paper ID 35

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Abstract: Recent research establishes the need for a new research agenda related to the production and impact of human capital. Driven largely by data availability, analysis focused on human capital investments is frequently reduced to the study of school attainment. The central element of an expanded agenda is the identification and incorporation of different dimensions of skills including new study into underlying measurement issues surrounding cognitive and noncognitive skills. Investigations of individual and aggregate outcomes now show that the measurement issues surrounding skills are very important. Moreover, these findings implicitly open questions about the integration of studies of the determinants of skills with those of the impacts of skills, because skill formation is known to involve more than just time in schools. Modern research also suggests a necessity of revisiting a variety of analyses in terms of causal claims and the implications of findings for policy issues. Newly available administrative data provide a means of tracing the development of skills through entire school careers and into later outcomes. And the upsurge of newly minted researchers in the area makes this a propitious research investment.

A Grand Challenge for SBE: Unlocking a New Cycle of Research for Human-Landscape Interactions

White Paper ID 245

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Abstract: The grand challenge is to more fully utilize the social, behavioral, and economic sciences to develop predictive capacity for integrated human-landscape systems, and to re-frame the complex interactions of these systems in new ways, in which feedbacks can be better understood, represented, and predicted. Historical approaches, which treated humans as external drivers of change, have not sufficiently captured interrelationships involving the effects of landscape change on societies and individuals and the effects of multiple human-caused stressors on landscapes. Meeting this grand challenge presents infrastructural as well as thematic and intellectual challenges. This paper summarizes key questions for the science of human-landscape systems, developed first from the perspectives of disciplines that may contribute, then presents potential research themes linking these disciplines, and outlines urgent research needs for advancing the science. These findings were developed at an NSF interdisciplinary workshop in March 2010. Better integrating social-scientific as well as environmental components of human-landscape systems offers the potential to transform our thinking and to unlock a new cycle of research for human-landscape systems that fully engages the SBE sciences. Enhanced understanding of human-landscape systems also promises novel solutions for mitigating and even reversing environmental degradation and its societal consequences.

Understanding the Drivers and Dangers of Academic Status Seeking: Studying the Impacts of Embedded Disciplinary Cultures in a Networked Academy

White Paper ID 267

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Abstract: The Academy should be alarmed about the growing reliance on the perceived prestige value of journals and university presses as default promotion criteria. This concern is urgent, given the trickle down of tenure and promotion requirements from elite research universities to less competitive institutions, and the resulting arms race in scholarly publishing. While the entrenched system of peer review provides a quality filter for busy faculty, the inflationary currency in scholarly publishing is over-burdening faculty referees. Faculty, paid by university salaries, provide their reviews to publishers for free while some publishers continue increasing university subscriptions. The academy needs empirical studies of the entire system of academic reputation and status seeking, where growing challenges to institutional review include assessing interdisciplinary scholarship, new hybrid disciplines, and the rise of heavily computational sub-branches of disciplines. A research agenda that emphasizes data gathering and analyses of peer review practices in academic promotion and publishing, the use of bibliometrics in promotion and university rankings, and the effectiveness of emergent publishing models, should transect epistemologies of sociology (network analyses, organizational behavior); economics (cost/benefit studies, rational choice theories); psychology; anthropology (ethnographies); political science (power dynamics, international relations); information science (bibliometrics); statistics; and media studies (media ecologies).

NSF/SBE Research for 2020 and Beyond: Enhancing Fundamental Knowledge and Benefits to Society

White Paper ID 171

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Abstract: There are several important issues that will require attention from the next generation of SBE researchers. The NSF/SBE should respond rapidly and substantively to major social problems confronting both the nation and the global community. In particular, SBE should prioritize devoting resources to addressing the large racial/ethnic disparities that exist within the United States (U.S.). The United States (U.S.) population is undergoing major demographic changes, with the minority population increasing so rapidly that it is projected to comprise roughly half of the U.S. population by 2045. Furthermore, given the increasing interconnection of the global community, innovative research is also necessary to enhance knowledge that benefits the global community. Below we propose nine research agendas -- five that address issues relevant to the U.S. and four with global relevance -- that should be integral to NSF/SBE over the next several decades.

Making the Case for Contract Theory

White Paper ID 104

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Abstract: Economics has changed a great deal in the last 30 years, and there is every reason to think that the changes in the next 20 to 30 years will be at least as great. Although theory may not be as prominent as it once was, it remains essential for understanding the (increasingly) complex world we live in. One cannot analyze the bewildering amount of data now available, or make sensible policy recommendations, without the organizing framework that theory provides. Contract theory is a good example of an area where great progress

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has been made in the last 30 years, and yet where much remains to be done. In this short essay I will discuss some of the major themes of contract theory and also issues that are still not well understood.

A Research Agenda for Understanding the Dynamics of Skill Formation

White Paper ID 314

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Abstract: This paper presents an agenda for research on skill formation.

Maximizing the Potential of Data Modern IT Tools, Best Practices, and Metadata Standards for SBE Sciences

White Paper ID 268

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Abstract: An unprecedented amount of data are produced by agencies and researchers in support of SBE research. However, the existence of data alone is not sufficient to maximize their utility, and the need for more accessible, open, and usable data is growing. Meeting such demand is a major challenge for data managing institutions that are not only facing a number of archetypal issues -- such as quality, timeliness, adequate documentation, privacy, security, comparability, and harmonization -- but also significant resource constraints. Furthermore, the globalization and virtualization of data and systems calls for a unification of practices to facilitate the process by which information may be delivered over the Internet or exchanged between organizations. New information technologies, tools, best practices, and metadata standards have emerged to meet these needs in a way that is both efficient and responsible, the adoption and diffusion of which can provide producers and researchers with a cohesive approach to data management and knowledge sharing. This in turn will open greater access to data, maximizing their usefulness for policymakers, students, researchers, and journalists. This paper examines how advances in technology and open standards may be leveraged upon to enhance manageability, discovery, accessibility, and usability of SBE data.

Individual Differences and the Social, Behavioral, and Economic Sciences

White Paper ID 235

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Abstract: The central thrust of the social, behavioral, and economic sciences during the next decade and beyond should be the extent to which people falling roughly in the normal or non-clinical range are physiologically and cognitively distinct from each other. Whether the source is genetic, early development, or more traditional environmental conditions, these differences are likely to have implications for all of the disciplines relevant to the social, behavioral, and economic sciences. An appreciation of this behaviorally-relevant physical and cognitive diversity would transform understanding of a variety of vexing problems, including political violence and an absence of trust in other people. Studying these variations properly will require interdisciplinary training, continued refinements of instrumentation, and a willingness to fund projects demonstrating creative applications of biological techniques and theories in order to come to grips with the rich diversity of human traits affecting the social, behavioral, and economic sciences.

Collective Intelligence

White Paper ID 299

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Abstract: As examples like Wikipedia, Google, and Linux illustrate, new information and communication technologies are now enabling dramatically new ways of connecting large numbers of people and computers to produce intelligent behavior. These new forms of "collective intelligence" are already having significant economic, social, and political effects, and their effects are likely to be even more transformational in the coming decades. Understanding these possibilities is one of the most important challenges -- and opportunities -- facing the social, behavioral, and economic sciences today.

Comments from the Population Association of America: Future Research in the Social, Behavioral and Economic Sciences

White Paper ID 221

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Abstract: The Population Association of America (PAA) is the premiere professional, scientific society for over 3,000 behavioral and social scientists who conduct research on the implications of population change. PAA members include demographers, sociologists, economists, health scientists, and statisticians. Population scientists rely on the National Science Foundation (NSF) for its support of large-scale longitudinal surveys as well as research projects and centers. The organization's recommendations reflect a desire that the NSF Social, Behavioral and Economic Sciences (SBE) Directorate will maintain and expand its investment in data infrastructure while also funding targeted, novel areas of research, over the next decade. The PAA recommends five major future research directions for the SBE Directorate: (1) human capital investment and the geography of families, (2) new data for studying american families, (3) causal inference in demography, (4) behavioral epigenetics and epidemiology, and (5) the study of behavior change.

Understanding the Use, Experience, and Consequences of Time Allocation in a Rapidly Changing Social Environment

White Paper ID 117

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Abstract: The study of how people use and experience time is not new. Research on the use of time goes back more than half a century in Europe and has become a standard part of most Western national statistical systems. In the United States, a series of small time diary studies was conducted from the 1960s through the present by individual social scientists, from the 1965-66 Multinational Comparative Time-Budget Research Project to the 2007-08 Child Development Supplement to the Panel Study of Income Dynamics. Furthermore, beginning with the development and implementation of the American Time Use Survey (ATUS) through the U.S. Bureau of Labor Statistics in 2003, this research can now be accessed by a broader group of social scientists in the United States. This brief report describes the value of research on people's use of time and some important questions that can be addressed with such data and methods. It details the limitations of current research and needed methodological advances to better understand the use of time.

Interdisciplinary Collaboration: Cognitive Conditions and Tools

White Paper ID 244

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Abstract: Interdisciplinary collaboration figures centrally in frontier research in many fields. Participants in interdisciplinary projects face problems they would not encounter within their own disciplines. Among those are problems of mutual understanding, of finding a language to communicate both within projects and with the scientific community and society at large, and of needing to master concepts and methods of different disciplines. We think that a concentrated research and development effort is necessary to analyze, on the one hand, cognitive conditions of successful understanding, communication, and interaction; and, on the other, to develop specific tools and methods that support and facilitate interdisciplinarity both in practice and in educational projects that prepare future generations of professionals within and outside of academia. Those tools need to be developed and their cognitive efficiency measured.

Understanding Human Behavior at Large Scales through Mobile Devices

White Paper ID 148

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Abstract: Smart phones, which come with a rich array of sensors and communication capabilities, are becoming more affordable and increasingly adopted by the general population. In this white paper, we argue that the increasing pervasiveness of these mobile devices offers researchers the ability to understand human behavior and real-world social interactions at a fidelity and scale that could not be accomplished before. We provide a brief case study of our own work in using location data from over 400 people to characterize aspects of both those people as well as the places they went. We also sketch out two major research challenges, in terms of the logistics of conducting this kind of research as well as managing privacy issues. We also argue that the costs of this kind of research are quite high, and that researchers need much more support from government and from industry to pursue this line of work, and that a large data collection and data sharing effort may be an effective way to proceed.

Some Compelling Broad-Gauged Research Questions in Economics

White Paper ID 134

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Abstract: Since the financial crisis, many political leaders (and indeed social scientists in universities) have called for limiting the role of economics and emphasizing for other social science disciplines. This paper lays out a series of questions and topics that support a program of broad-gauged economic research.

Getting SBE Science Out There

White Paper ID 202

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Abstract: NSF should not solely rely on researchers to generate broader impacts for their science. The academic ivory tower is very tall, and its walls are quite thick. Researchers simply aren't trained to disseminate, nor to generate informed policy recommendations based on their scholarship. Instead, I argue NSF could greatly enhance the potential for its supported research to make societal contributions through also supporting bridge organizations to engage in syntheses and dissemination. The Center for Public Information on Population Research (CPIPR) at the Population Reference Bureau (PRB) is offered as an instructive example.

Challenges in Econometrics

White Paper ID 315

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Abstract: The biggest challenges faced by economists in terms of analyzing economic data concern fundamentally different configurations of the data, with complex, largely unknown, dependence patterns and relatively large numbers variables per unit. In such cases, the current methods to do approximate inference based on large sample results, which are specifically designed to exploit laws of large numbers and central limit theorems, are likely to be inadequate. Moreover, trying to fit these more complex data configurations into the old methods would be unlikely to lead to much progress.

Research Opportunities in the Study of Social and Economic Networks

White Paper ID 122

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Abstract: Social network patterns of interaction influence many behaviors including consumption, career choice, employment, investment, voting, hobbies, criminal activity, risk sharing, and even participation in micro-finance. Networks of relationships among firms and political organizations also impact research and development, investment decisions and market activity, international trade patterns, and political alliances. The study of how network structure influences (and is influenced by) economic activity is becoming increasingly important because it is clear that many classical models that abstract away from patterns of interaction leave certain phenomena unexplained. For example, the fact that information about jobs is largely disseminated through social networks has significant implications for patterns of wages, unemployment, and education. Beyond the many economic settings where social structure is critical, the study of social and economic networks can also benefit from an economic perspective. Tools from decision theory and game theory can offer new insight into how behavior is influenced by network structure and can also be used to analyze network formation. In addition, network analysis provides new opportunities and challenges for econometrics, laboratory and field experiments, and they are beginning to shed new light on the impact of social interactions ranging from favor exchange to corruption and economic development.

The Vortex of Labor

White Paper ID 217

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Abstract: Three factors constitute the new global division of labor that causes structural unemployment in advanced industrialized countries: (1) Globalization has increased outsourcing and off-shoring with manufacturing jobs and white collar work moving overseas. (2) Lean production has moved throughout the manufacturing industries of the world, with the service industries following behind. Lean production reduces jobs but can also create some jobs. (3) Advanced technologies reduce old jobs (e.g., newspapers, post office, etc.) but also create new jobs. The Internet allows jobs to be done from

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anywhere in the world, which aids off-shoring, and automation reduces jobs but creates a few jobs in design and maintenance. These three forces destroy and create jobs in a maelstrom of processes, which are connected in complex ways. The challenge of understanding this vortex of labor is to put these diverse markets and social forces together to explain the distribution of investment and employment. It is not only actors (corporations, states, labor, and institutions with rules and regimes), but also the instruments and interactions of contemporary global networks and information technologies that accelerate job flows across the globe. These processes can be synthesized in three distinct national models: the profit, market share, and neo-corporatist models.

Total Survey Error, Data Quality, and Statistical Error: Recommendations to the National Science Foundation's Social, Behavioral, and Economic Sciences Directorate for 2020 Planning

White Paper ID 296

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Abstract: Social, behavioral, and economic research funded by NSF SBE is often interdisciplinary in nature (i.e., using multiple research methodologies). All research methodologies have strengths and weaknesses; one way to express these is through statistical error (e.g., sampling error, nonresponse error, measurement error). The Total Survey Error perspective on measurement and statistical estimation (Groves et al., 2009) accounts for most potential error sources in statistical estimates. We propose that this framework -- although it provides a general road map to measurement and reporting of statistical findings -- needs to incorporate other statistical and psychometric fields. This white paper briefly addresses the primary strengths and weaknesses of each approach to error and offers suggestions for evaluating a proposal's approach to error. We recommend that NSF-SBE strengthen statistical error research by (1) requiring more documentation of and research into data quality and statistical error on substantive proposals, and (2) prioritizing data quality and statistical error research as a fundable research aim itself. Such research is essential because it builds on the basic components of statistical inference used by quantitative researchers, encourages stronger ties between substantive and methodological research, and provides a link among different facets of methodological and statistical research.

Vigilant Interaction: Managing the Vulnerabilities in Online Knowledge Collaborations

White Paper ID 160

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Abstract: The online world thrives by providing ever increasing opportunities to prospect new ties, exploit business opportunities, challenge old norms, and create unprecedented novelty in services, products, and business models. But the opportunities and possibilities also mean expanding vulnerabilities. We advocate research on vigilant interaction and a need for more dynamic and contextualized models that account for trust asymmetries, deception, and novelty.

Understanding the Implications of Increased Lifestyle Diversity

White Paper ID 247

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Abstract: Lifestyles, defined as contrasting patterns of how people spend their time (e.g., work, leisure, education, consumption, and family life), are crucial to understanding socioeconomic outcomes. Because of a number of changes, including recent developments such as the Internet, lifestyle diversity in increasing, possibly contributing to increased inequality. Future research should focus on specifying lifestyle diversity, the various forces that influence lifestyle, and the possible implications of increased lifestyle diversity. Given the complexity of this project, significant interdisciplinary collaboration will need to occur. Various pieces of existing research needs to be brought together to understand how various forces (structural, cultural, and individual) interact to influence how we live our lives.

Toward an Analytics of Gender

White Paper ID 291

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Abstract: In response to the call from the NSF/SBE 2020 Corpus, this white paper proposes and addresses the following two grand challenge questions: How will changing experiences of gender influence social science methodology and challenge fundamental assumptions behind disciplinary research? And why should survey design and data collection include rigorous operationalizations of gender in order to improve the quantitative data infrastructure? The conflation of sex and gender as a fundamental assumption of social research in the domain but not the data infrastructure is then discussed. It is then posited that in order for multiple variances are to be accounted for in both design and implementation of social research a quantitative measure of gender must emerge as an important objective aspect of the generally accepted dominant paradigm governing scientific research into the next 20 years.

A New Architecture for the U.S. National Accounts: A Grand Challenge for the National Science Foundation

White Paper ID 138

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Abstract: The purpose of this grand challenge for the National Science Foundation is to accelerate the development of new economic data for the resolution of policy issues involving long-term growth.

Measurement and Experimentation in the Social Sciences

White Paper ID 150

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Abstract: I propose to build an advanced data collection environment for the social sciences that maximizes opportunities for innovation, and is fast, cost effective, and easy for everyone in the scientific community to use. The core of this laboratory is a representative panel of households in the United States who have agreed to be available for regular interviews over the Internet. The Internet panel is representative in the sense that respondent recruitment is based on a probability sample. Internet access will not be a prerequisite for participation in the panel. If a respondent does not have Internet access at the

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time of recruitment into the panel, he or she will be provided with a laptop and broadband access. The laboratory will incorporate and pioneer new forms of data collection -- including, but not limited to, smartphones, self-administered measurement devices for the collection of biomarkers, experience sampling, web cameras, global positioning system (GPS) devices, accelerometers to measure physical activity, and eye tracking equipment.

Scaling Down: Social and Economic Processes over time at a Local Scale in the U.S.

White Paper ID 261

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Abstract: Many have been hailing the advent of the spatial turn in the social sciences, but for the most part, the materials are not available to take advantage of this in the U.S. before 1980. Students of long-term demographic, economic, ecological and social change in the U.S. have been forced to work at the county level because that is the level for which the census has published the majority of its statistics for the 19th and early 20th centuries. I propose an enlargement of the National Historical GIS to include all years for which the census is available keyed to maps that locate the minor civil divisions and their changes over time. Because the year 1880 is available as a full count, and 1850 soon will be, investigators will be able to work at a smaller spatial scale, group the smaller units together into more meaningful spatial units, and even study variables that were not reported before. With the accompanying maps, they could investigate long term processes at the appropriate scales and show how changes over time have affected the scale at which these processes occur.

Application of Complexity Science to the Study of Social Systems

White Paper ID 228

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Abstract: To avoid the pitfalls inherent in the current reductionist approach to understanding of social systems, we advocate applying complexity science approaches to studying social systems. Social systems consist of multiple, diverse agents dynamically interacting on multiple levels in which positive and negative feedback produces circular causation extending from the molecular and cellular levels to that of the dyad, household, and community. Fundamental understanding of complex social phenomena cannot be obtained through the piecemeal application of static, uni-scalar, linear approaches; they must be viewed and studied as complex adaptive systems. To date, most research on complex social phenomena either limit their focus to a particular level within the multi-level reality or take a static view of the phenomenon. Such research would need to be multidisciplinary and involve novel multimethod and analytic approaches. What is needed is an initiative which not only supports the development of a common lexicon across disciplines and the diffusion of novel analytic techniques, but also supports longitudinal, multi-level study of social systems which specifically measures nonlinearity, identifies attractors and bifurcations, and seeks patterns and interdependencies at work.

A Framework for Researching Student Creativity in Game-based Learning Environments

White Paper ID 251

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Abstract: Creative thinking and behavior are increasingly hailed as important skills for American students, but how can it be promoted and assessed at the classroom level? We address this fundamental question of how to derive novel, useful ideas that are high in quality by first framing the need to engage students beyond traditional lectures, test preparation, and assessments. Next, we present a framework for studying student creativity in game-based learning environments grounded in seminal research within three areas: (1) artistic and kinesthetic creativity; (2) cognitive aspects of deriving novel ideas; and (3) the social-psychological dimension of communicating these ideas in the context of

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peer learning. The paper concludes with recommendations for advancing research on this issue by partnering with schools, developing compatible, interdisciplinary research agendas and working with stakeholders.

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Urban Space with Instant and Ubiquitous Access Technologies

White Paper ID 312

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Abstract: According to the United Nations, the world will need to build new cities and/or expand existing cities to accommodate about 1.6 billion additional urban residents by 2030. This rapid trend is the result of many complex socio-economic and political factors, and poses unprecedented challenges to the functioning of cities and the quality of life for urban dwellers. The resources needed for accommodating new urban dwellers will be enormous. Can emerging information, communication and ubiquitous access technologies help us to achieve a sustainable global urban system in a ubiquitous technology space, mitigating the consumption of scarce resources?

Synthesis and Cyberinfrastructure for SBE Research

White Paper ID 241

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Abstract: Insights from the social and behavioral sciences, as well as from economics, are increasingly recognized as essential components of solutions to an enormous range of problems faced by the United States. There is an increasing need for social scientists to integrate their understandings with those of life and physical scientists, mathematicians, engineers, and policy makers to achieve transformative understandings of the ways in which we can use diverse and complex data to address problems of coupled social and natural systems. NSF has invested heavily in cyberinfrastructure in the natural sciences. For social science to deliver effective, policy-relevant knowledge, substantial investments in social science information infrastructures are essential. Many cyberinfrastructure challenges faced by social science are qualitatively different than those of the natural sciences because of the diversity and complexity of our data. While we can leverage cyberinfrastructure investments in other domains, we cannot just piggyback on them. We need sustained investments in social science synthesis and cyberinfrastructure, and social science-driven research on the integration of social and natural science data in the investigations of coupled social and natural systems. The problems are too important and the potential payoffs too large to delay.

White Paper Encouraging an Agenda for Social, Behavioral, and Economic Sciences to Advance Measurement Serving Community Based Research

White Paper ID 224

Abstract: The evaluation and assessment of community health and of interventions designed to improve it are critical for informed health planning and policy-making. In recognition of the importance of communities to the nation's health, the NIH has identified community engagement as a core component of its Clinical and Translational Science Awards (CTSA).
Social, behavioral, and economic scientists should collaborate with community

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researchers to enhance the conceptualization and measurement of community health, the mechanisms and outcomes of interventions designed to improve health, and the impact of local contexts on both communities and outcomes. Critical goals include: (1) develop theories to describe the impact of simple and complex interventions in communities; (2) standardize and promote measurement of context variables so that relevant local factors are measured and accounted for; (3) develop an understanding of how to employ existing data regarding context to enhance our capacity to generalize beyond local communities; and (4) identify factors and metrics needed for the design of studies in which communities are randomized with appropriate measurement and statistical control of key confounders at the community level.
The development of community health research as an applied translational science needs the focus of social, behavioral, and economic scientists. The public health depends upon it.

For the Context Subcommittee of the Outcomes Committee of the Community Engagement Key Function Committee of the National CTSA Consortium

Existing Specialty Schools as Leverage for Behavioral Sciences Research on Teaching and Learning in STEM Fields

White Paper ID 287

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Abstract: The National Science Foundation has requested comments and proposals that outline challenge questions for the next decade in behavioral sciences research. At the same time, the NSF has joined the President's Council of Advisors on Science and Technology as well as the National Academy of Sciences in issuing reports first identifying the need for specialized STEM education as a strategic necessity and then proposing the establishment of an additional 1000 specialized STEM schools. A common theme in these reports is that foundational work must be conducted to establish effective organizational and instructional practices for these schools. The authors of this paper serve as directors of a national organization of 92 such schools, and as representatives of two of the schools used as exemplars in the PCAST report they challenge the National Science Foundation to engage and extend existing research relationships with these willing laboratory schools as a means to accelerate the work in the learning and behavioral sciences that must be conducted for this national endeavor.

Epistemic Engineering

White Paper ID 277

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Abstract: The epistemic understanding of complex systems is underdeveloped. The perspectives of engineering and design should be brought together with modern complexity theory to create epistemic engineering. Epistemic engineering is the study of the design principles of agent-based processes viewed from the perspective of their tendency to help or frustrate the production of local truth. Epistemic engineering has many different applications extending well beyond social systems with human agents, for example, the stigmergic organization of an anthill, agent-based software systems, and multi-robot systems. Complex systems exhibit emergence and self-organization, which make it hard to apply traditional engineering concepts and methods. With the paradigm of complex engineered systems, however, performance characteristics emerge from the implemented system rather than existing in a fully specified form ex ante. This approach to engineering seeks opportunistic leveraging of the combinatorial explosion. Criteria such as optimality and stability are replaced by criteria such as robustness and versatility. Epistemic engineering can teach us

how to gain from the vast knowledge potential of complex systems in spite of limits on prediction and control. It has transformative potential where large numbers of knowing agents respond in unexpected ways to dynamic environments, science policy, economic policy, robotic systems, and medicine.

Effective Collaboration in a Complex and Interdependent Society

White Paper ID 54

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Abstract: We are confronted by a world filled with complex social issues, extensive interdependencies, and vast numbers of diverse stakeholders with competing interests. Globalization and unprecedented access to information have eroded the foundations of common ground that were once possible with isolated, homogenous communities. No longer can we rely on an assumed social consensus to stabilize our policy development. These realities all point to one overarching challenge: the ability of individuals and groups to make meaningful and productive decisions together. Therefore collaboration needs to play a prominent role in all aspects of society. As such, the full force of the social and behavioral sciences is needed to expand our understanding of collaboration and how we can make better decisions collectively. Scholars must think critically about how to increase the capability of people to make collaborative decisions and to represent the diverse interests of multiple stakeholders. By providing means to enhance stakeholder participation, drive ethical conflict resolution, foster meaningful deliberation, stimulate effective idea generation, and make better decisions together, we can begin making substantive progress towards addressing the complex problems that confront our society in the 21st century.

White Paper: Institutional Review Boards

White Paper ID 43

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Abstract: Institutional Review Boards are a critical component of any university research program involving human subjects in the humanities, social sciences, or medical fields. Although a fair amount has been written either attacking or defending IRBs, there has been little systematic examination of the nature of the interactions within IRBs or between campus IRBs and researchers to understand how IRBs and researchers operate and how the research process might be improved while still protecting human subjects as required by the law. This white paper proposes there is a need to examine both the interactions within IRBs including their compliance officers and staff and the interactions between IRBs and researchers to promote and improve the quality of research in the coming decades regardless of the particular subject area.

Implications of the Financial Crisis for the Grand Challenge Questions for the NSF/SBE

White Paper ID 304

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Abstract: The recent crisis has highlighted areas and questions that would be extremely valuable to investigate in greater detail. I will choose to touch only on a few of these topics in this limited space and will purposely range widely rather than try to deeply develop on subset of ideas. My four themes will be: the role of economic history and comparative economics ; the expectations formation process and learning; interaction between and effectiveness of monetary and fiscal policy; and interconnectedness and too big/too interconnected to fail.

Modelling and Testing Human Interactions in the Laboratory and the Field

White Paper ID 65

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Abstract: In the past decade, researchers in economics have carried out considerable research on human behavior in social and psychological environments. Many interesting patterns have been found, but a great deal remains to be done. In particular, interdependent preferences have been somewhat successfully modeled for two-person environments, and the experimental study of groups, identity, group membership, and peer effects has recently blossomed. Yet, researchers outside the U.S. are performing much, if not most of this largely interdisciplinary research, as these researchers often have much easier access to substantial research funding. We feel that it is critical that funding be made available in these important areas, lest the U.S. fall further behind in this vital research.

Understanding Slow Onset Disaster in the Age of Climate Change

White Paper ID 47

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Abstract: Slow onset disasters are representative of the types of challenges the scientific community will face in the 21st century. A slow onset disaster is the intersection of changing environmental conditions, lagging adaptive capacity of both human and ecological communities, and pressures of chronic poverty and disease. This research challenge focuses on societal flexibility and survival capacity through developing solution-based science to address the seemingly intractable issues associated with climate change. The key aim of this challenge is to develop interdisciplinary approaches that utilize innovative methodologies to comprehensively address the legacy landscapes that comprise the current context in which societies are situated. The intersection of climate change, sudden and slow onset disaster has a cumulative effect upon localities – understanding local response and resilience are needed to identify solutions where recovery from such events is both slow and long term. The research challenge is to develop comprehensive databases, sampling strategies, and monitoring schemes that link science and research to tangible policy-driven solutions.

The Communicational Factors Underlying the Mental Disorders

White Paper ID 51

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Abstract: In light of an overall communicational model for mental illness, the principles of the scientific method are necessarily employed: namely, (1) propose a hypothesis, (2) make predictions from that hypothesis, and (3) test the accuracy of the predictions within an experimental setting. According to Step (1), the major hypothesis has initially been established; namely, mental illness represents the transitional interplay of the double bind and counter double bind maneuvers in relation to the vices of excess. According to this radical interpretation, mental illness represents a concerted communicational process to transition into the realm of excess.

Transforming Science Studies through Collaborative Informatics Approaches and Infrastructure

White Paper ID 170

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Abstract: Science studies, including history and philosophy of science (HPS), are fundamental for understanding science and what makes it work. However, HPS has typically involved isolated projects, only occasionally collaboratively, digitally, and widely accessibly. New informatics approaches are changing the scope and scale of analysis, enabling collaborations, changing underlying conceptions of knowledge, and enabling deeper integration, including connections with scientific communities. Digital HPS therefore (1) transforms HPS scholarship and use, (2) transforms understanding of how science works, and (3) impacts policy and education decision makers where understanding how science works is crucial. Taking full advantage of these possibilities requires investment in sustainable informatics approaches and infrastructure that NSF has not traditionally supported. Science studies and HPS will need funding to research, build, and maintain informatics infrastructure and its own synthesis center(s) that can (1) integrate results of individual research projects, (2) transform understanding of the scientific process, both historical/philosophical as well as social/technological, and (3) respond to broader impact needs of science in society, science of science policy, and history and nature of Science connected with science education. We propose a series of workshops to move quickly toward building capacity through informatics and infrastructure development in science studies.

For the Digital HPS Consortium

Food (In)Security

White Paper ID 89

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Abstract: Since 2008 over 30 countries have experienced riots and protests because of problems associated with increasingly limited and volatile food supplies. Changes in the global supply of food have also been a key factor associated with a dramatic increase in malnutrition over the same period of time. We argue that future research in the social, behavioral, and economic sciences should be devoted to the study of the causes and consequences of food security. And we specify they ways in which the study of food policy has implications for our understanding of both domestic and international commodity markets, international trade and investment, and inter- and intra-state conflict.

A Potential Agenda for SBE for 2020 and Beyond

White Paper ID 294

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Abstract: The social, behavioral, and economic sciences remain highly compartmentalized at the onset of the 21st century. Despite the fact that disciplines such as sociology, psychology, political science, geography, anthropology, archaeology, economics, law, mass communications, and others share similar epistemological frameworks and analytical tools, the cross-fertilization of these disciplines is in its infancy. Even more evident is that the disciplines traditionally viewed as "hard sciences," such as engineering, mathematics, physics, biological sciences, and chemistry, remain almost completely orthogonal to the social sciences -- except for archaeology, physical geography, and biological anthropology. A grand challenge agenda that would be both foundational and transformative could focus on the interface and interactions between the cultural and natural environments that the hard and social sciences study in isolation, and examine these connections across multiple levels of analysis, for example from the molecular or genetic level up through broad geographic or societal scales. Hard sciences are being

encouraged to include the human element (the expertise of researchers in SBE) in grant proposals. Such an agenda would benefit from more widespread applied research and the ultimate translation of this work into public policies that ameliorate human suffering and enhance quality of life.

Linking Biological and Social Sciences in SBE

White Paper ID 263

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Abstract: Future advances in social, behavioral, and economic sciences can be both promoted and accelerated by seeking ways to understand the biological bases of social patterns and processes. Significant opportunities arise from theoretical, methodological, and empirical advances in both social and biological sciences, but historical factors limit the degree to which these fields can be linked. Tremendous quantities, kinds, and ranges of genomic data mandate the immediacy of working in both biological and social sciences. Such data present foundations for articulations between biological and social sciences. Novel theories in both areas also create a major push towards interdisciplinary collaborations. Furthermore, revolutionary advances in technology, particularly in nanoscale biosensing, offer unprecedented opportunities to undertake biological research in ways that remain to be conceived. SBE needs to be prepared to support research that avails itself of entirely new technologies, methods, and paradigms in biological and social sciences. These new directions should be informed by critical questions facing social science, with extensive interactions with biology. Ultimately, knowledge generated by emerging approaches will have direct and significant impacts on addressing persistent social problems, with major implications for the future directions of government and non-governmental agency policy and resources.

Inclusive Decision Making

White Paper ID 169

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Abstract: Recent findings in social cognitive neuroscience have demonstrated that social interactions have profound effects on the neurochemistry of our brains, which in turn has effects on our cognitive and emotional functions. We seek ways to expand these findings and apply them to the design of decision structures in work places, political systems, schools, and everywhere else. As society and technology go through rapid changes, the aim of this research is to direct the investigations of cognitive neuroscience toward making such decision structures more inclusive, so that average citizens experience themselves as part of the change process instead of helpless pawns. This research effort would deal with interactions between individuals and groups, and therefore engage numerous disciplines including experimental psychology, neuroscience, economics, political science, sociology, anthropology, literature, philosophy, and religion.

Virtual Model Validation for Economics

White Paper ID 113

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Abstract: How can economic policies lead us to greater wealth, welfare and happiness? There is no bigger question in economics. The answer lies in correct economic theories that capture the causality linking policies to outcomes. Economic theories are a dime a dozen -- we have more theories than we have human beings. The key need to answer any economic question lies in our ability to validate theories. Do we live in an Austrian world? In a Keynesian world? A world of rational expectations? This white paper proposes that major advances in simulating virtual economies is possible and can form the basis for rapid and

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accurate assessment of current and future economic models. I make general proposals for developing infrastructure as well as presenting specific ideas about the nature of models of sophisticated expectations that are needed to allow artificial agents to mimic the behavior of real human beings.

Transforming Economics, Social and Engineering Research to the Science of Disaster Resiliency and Recovery

White Paper ID 105

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Abstract: The recent devastation caused by disasters, both natural and man-made, has led policy makers to an increasing awareness of the importance of long-term prosperity and sustainability of economic regions and the well-being of their residents. The issue is of great interest to economists, social scientists, and engineers. A grand challenge for future research is to transform decades of findings from these disciplines to simultaneously address the decision making involving the infrastructure (i.e., built environment), social issues (e.g., safety and well-being of vulnerable populations), and economics (e.g., sustainability of production and consumption) inherent in a community to (1) take effective actions prior to a disaster event to minimize its potential impact; and (2) implement system-based strategies to stimulate recovery when an event occurs. Research is urgently needed to expand, develop, and transform the current theoretical and empirical frameworks for characterizing, quantifying, and modeling resiliency and recovery at community scale over an extended period of time.

The Science of Research Synthesis: An Empirical Foundation for Future Research in the Social, Behavioral, and Economic Sciences

White Paper ID 259

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Abstract: Scientific methods of research synthesis are well developed but underutilized in the social, behavioral, and economic (SBE) sciences. Scientific approaches can be applied to all of the steps in the research review process. Rigorous efforts to locate, analyze, and synthesize results of previous studies will provide more robust answers to questions about what we know and what we don t know, and can provide useful empirical foundations for future research in the SBE sciences. The science of research synthesis can transform \and propel the SBE sciences, but changes in current norms, infrastructure, and capacity will be needed to support this transformation.

Society for Public Health Education (SOPHE) White Paper on Applied Approaches to the Social and Behavioral Health Sciences: Response to the National Science Foundation Call for Recommendations on Future Research in the Social, Behavioral, and Economic Sciences

White Paper ID 213

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Abstract: Complex and dynamic societal and community factors continue to challenge the capacity of social and behavioral sciences to overcome intractable health problems. The Society for Public Health Education (SOPHE) endorses the strategic vision of the NIH Office of Behavioral and Social Sciences Research to advance the social and behavioral sciences related to these challenges. SOPHE proposes, however, an additional priority to address the challenges: the development of applied approaches to the social and behavioral health sciences. The development of applied social and behavioral health sciences would constitute a fundamental change from the predominant science approach, which focuses on research that identifies universally applicable interventions that are then implemented by practitioners. This prevailing linear approach to social and behavioral sciences offers little promise for overcoming the persistent problems facing us today. An applied social and behavioral health sciences approach, similar to applied physical sciences such as engineering, would require a foundational and transformational change in our dichotomy of research and practice. It would also require the development of new disciplines of the science of application that are sensitive to the complexity, interactivity, and uniqueness of community, as well as modification of our health-related professional preparation programs to develop applied scientists.

On behalf of the Society for Public Health Education

SBE 2020: A Complete Theory of Human Behavior

White Paper ID 93

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Abstract: I propose the following grand challenge question for SBE 2020: can we develop a complete theory of human behavior that is predictive in all contexts? The motivation for this question is the fact that the different disciplines within SBE do have a common subject: Homo sapiens. Therefore, psychological, sociological, neuroscientific, and economic implications of human behavior should be mutually consistent. When they contradict each other as they have in the context of financial decisions, this signals important learning opportunities. By confronting and attempting to reconcile inconsistencies across disciplines, we develop a more complete understanding of human behavior than any single discipline can provide. The National Science Foundation can foster this process of consilience in at least four ways: (1) issuing RFPs around aspects of human behavior, not around disciplines; (2) holding annual conferences where PI's across NSF directorates present their latest research and their most challenging open questions; (3) organizing summer camps for NSF graduate fellowship recipients at the start of their graduate careers, where they are exposed to a broad array of research through introductory lectures by NSF PIs; and (4) broadening the NSF grant review process to include referees from multiple disciplines.

Spatial Inequality: A Research Agenda for the Social Sciences

White Paper ID 108

Abstract: This white-paper documents the need for the development of research on spatial inequality across the social sciences. Building on and significantly extending earlier work initiated as part of Santa Barbara's NSF-

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supported Center for Spatially Integrated Social Science, we see the need to greatly expand empirically and further theorize the consequences of rising spatial inequality within and outside the U.S. As global economic, social, and climate changes rapidly alter the fortunes of populations, a more cohesive social science understanding of spatial disparities is needed. Spatial inequality addresses how and why valued resources vary across places; and how places themselves become markers and makers of inequality. Spatial inequality bridges the geographic and non-geographic social sciences and the different inequality traditions within sociology, economics, political science, and geography. This white paper calls for a fundamental shift from social scientists' past tact in addressing spatial disparities through production of segmented literatures underpinned by limited dialogue between disciplines. Attention to spatial inequality opens new thematic areas for investigation, fosters cross-fertilization of theoretical and empirical traditions, and responds to issues central to society's well-being. We argue for a new generation of research to carve out theory and research across and within disciplines and leverage cutting-edge work.

A Reassessment of the Role of Offender Risk in Criminal Decision Making

White Paper ID 135

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Abstract: The study of offender decision making in criminology is highly important to theoretical concepts of deterrence as well as practical policies aimed at deterring past and future offenders from engaging in criminal activities. Most of the criminological literature on decision making has aimed to study offender risk perceptions, but has had a somewhat narrow focus in how risk is likely processed by offenders. Recent findings however, have sought to expand this previous treatment of the concept of offender risk. This paper reviews key recent findings on this topic, and outlines some key research questions which invite a multidisciplinary approach for a future scholarship in this area.

The Scientific Strategy of Conserving and Researching Existing Anthropological Museum Collections

White Paper ID 271

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Abstract: Systematic anthropological collections are valuable and nonrenewable resources that allow ground-breaking, interdisciplinary research on multiple geographical and temporal scales. For the research potential of these collections to be realized, they must be preserved and conserved. NSF should provide support for the care of systematic anthropological collections (as it did in the past, and as it currently does in the Directorate for Biological Sciences), create a special program to fund collections-based research, and foster the use of collections (and archaeological collections, specifically) in science education. Current NSF policies that run counter to preserving the research potential of collections should be discontinued.

Credibility Assessment Research

White Paper ID 254

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Abstract: The needs for credibility assessment are now magnified in the post-September 11, 2001 environment. Despite conclusions of a National Research Council (2003) report documenting limitations in current practice and recommending substantial investment in development of new methods, and a report from the National Science Foundation (2006) calling for an integrated approach -- one that capitalized on the respective strengths of the different approaches, provided adequate control over error rates, and produced decisions that are optimized for different contexts -- no governmental agency of sufficient presence and resource has risen to the challenge. Although there have been significant advances in interviewing and sensing methods in the time since, the efforts remain fragmented, of uneven quality, and substantially under-funded. The National Science Foundation is ideally poised to serve as a focus for research and development in this critical area. In such a role, the NSF would place credibility assessment within a broader scientific perspective, would assure that promising methods were identified and evaluated on the basis of peer review, and would help sensitize the community of scientists and developers to the requirements for field evaluation and deployment.

Identifying the Quaternary Period Record of Cosmic Impact and Exploring Its Implications for Past Human Biological and Sociocultural Evolution and Future Societal Response

White Paper ID 292

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Abstract: The role of cosmic impact by asteroids and comets is explored in relation to human biological and sociocultural evolution during the past three million years of the late Pliocene and Quaternary Periods (the Quaternary Period constitutes the past 2.6 million years). Human societal risks relating to potential future cosmic impact is also addressed. The specific challenge question is: to what degree has cosmic impact by asteroids and comets affected human individuals and societies during the past 3 million years of human biological and sociocultural evolution, and how might the study of these past impacts benefit attempts to model risks and mitigations of future impact? The paper highlights the conundrum in which data contained in current planetary science models of cosmic impact risk and rates strongly suggest that cosmic impact played a significant role in human biological and sociocultural evolution, including the recent development of human civilization, and yet this apparent fact is intentionally downplayed or ignored apparently due to the many gaps in the historical record of impact. Members of the social, behavioral, and economic sciences have a significant opportunity to participate in the development and analysis of a robust database of Quaternary Period cosmic impact.

Understanding the Mechanisms of the Mind through an Integrated Science of the Mind Initiative

White Paper ID 159

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Abstract: This white paper proposes an initiative to create an integrated science of the mind. This science would integrate and expand theory, method, models, and training to achieve a new, and potentially paradigm-shifting, scientific framework for understanding the operation of the mind. An integrated science of the mind would encompass a wide range of topics related to mental processes and behavior. The purpose of this white paper is to indicate how the cross-disciplinary integration of basic research could transform science practice, leading to new breakthroughs in our understanding of the mind that will enhance human productivity, health, and well-being through better education and enhancement to human decision making and social engagement, while also creating new technologies that will further enhance productivity, safety and well being while spurring future industries and enhanced economic development. We lay out the broad vision, discuss this

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vision in relation to the several relevant research topics, and describe opportunities for building systemic change in research practice and research funding through a multi-directorate and multi-agency effort initiated and coordinated by the NSF SBE Directorate. Related white papers provide details of the specific opportunities in three selected areas within the scope of the overall science of the mind.

Language and Interest in the Economy: A White Paper on "Humanomics"

White Paper ID 9

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Abstract: Economics ignores persuasion in the economy. The economics of asymmetric information or common knowledge over the past 40 years reduces to costs and benefits but bypasses persuasion, "sweet talk." Sweet talk accounts for a quarter of national income, and so is not mere "cheap talk." The research would direct economics and the numerous other social sciences influenced by economics back towards human meaning in speech meaning, which has even in the most rigorously behaviorist experiments been shown to matter greatly to the outcome. Sweet talk is deeply unpredictable, which connects it to the troubled economics of entrepreneurship, discovery, and innovation. The massive innovation leading to the Great Fact of modern economic growth since 1800 is an important case in point. Some economic historians are beginning to find that material causes of the Great Fact do not work, and that changes in rhetoric such as the Enlightenment or the Bourgeois Revaluation do. A new economic history emerges, using all the evidence for the scientific task: books as much as bonds, entrepreneurial courage and hope as much as managerial prudence and temperance.

Future Research in the SBE Sciences: A View from Anthropology

White Paper ID 194

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Abstract: Future research in the SBE sciences should challenge and broaden our fundamental reliance on assumptions of economic rational choice as the basis for human behavior, including social behavior. This will extend multidisciplinary science and scientific methods to new research on how non-economic structures fundamental in shaping human behavior arise, how they are maintained, and how individuals refer to structure in rationalizing choices. Structures refer to preferences, values, beliefs, cultural rules, norms, and precedence and appear in anthropological and economic sciences as an ontological and historical force constraining and shaping human choice. Challenging questions of the future that will unlock new interdisciplinary SBE science will probe how, at what scales, and with what predictability cultural structures arise and constrain human behavior. Effective scientific definition of structure itself remains a critical component of such research, which offers the potential to propel behavioral modeling and prediction apace with increasingly sophisticated computation and measurement tools. Such research will require partnerships across the SBE and STEM disciplines and will be transformative in its engagement with the large-scale, long-term cultural structures that lie outside of conventional scientific epistemologies.

What Would Happen to the Human Sciences If We Took Seriously the Fact That Behavior Is Caused by Mental Mechanisms That Evolved to Execute Specific Functions?

White Paper ID 128

Abstract: Functional organization requires explanation. The only known natural causal process that can generate complex functional order is natural selection. This fact is widely appreciated in disciplines that seek to understand non-human behavior and cognition and in some areas of human psychology (e.g., perception), but in the human social, behavioral, and economic sciences, natural selection's unique role in creating functional organization is generally ignored. As NSF's SBE Directorate advances, the time is ripe to bring the social, behavioral, and economic sciences into conceptual integration not only with other facets of psychology but with the other life sciences as well. Promoting

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research that starts with rigorous analyses of the forces that sculpted the human brain and with models of why highly improbable computational neuro-circuitry for a given behavior exists at all can help to unlock many mysteries of human nature. We posit that a truly interdisciplinary approach -- one that uses the conceptual tools of evolutionary biology and that integrates computational, developmental, and neuroscientific levels of analyses -- will help to fulfill the aims of the SBE Directorate, not only in the quest for discovering human nature, but also in identifying how a brain sculpted by ancient forces might address modern challenges.

Diversity in the Social, Behavioral and Economic Sciences

White Paper ID 189

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Abstract: This white paper focuses on issues of diversity in a broad sense and offers recommendations aimed at increasing diversity in SBE research. Our primary focus is on the benefits of multiple perspectives and new forms of research partnerships and networks. That is, our approach to diversity is driven not on considerations of fairness or equity alone, but rather by the argument that the quality and relevance of SBE research itself will benefit from diversity. We argue for building on the dramatic progress made in the SBE sciences in recent decades by thoughtfully and strategically increasing the range of our samples, so that boundary conditions on findings can be established, cultural processes can be better understood and application to real world problems can be put on a stronger foundation. We also call for increasing the diversity of the SBE scientists so that the design, methods, materials, theoretical questions and results benefit from multiple perspectives. Accomplishing these goals will require widespread institutional efforts across many of the experimental branches of the social, behavioral and economic sciences.

Rethinking 21st-Century Urban Transformations: Race and the Ecology of Violence

White Paper ID 182

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Abstract: Historical policies and practices such as redlining, urban renewal, and concentrated public housing have made for mutually reinforcing linkages between race, space, inequality, and violence. What is new in the 21st century is that many of these historical linkages are exacerbated by current urban transformations that affect low-income Black families to a similar extent that urban renewal did in the 1950s and 60s: including public housing demolition, gentrification of many inner-city neighborhoods, and the worst housing crises in U.S. history. As these conditions accumulate and grow more severe, so also, it appears, does the rise in urban gun violence. If the 1960s riots were, in the words of Dr, King, the language of the unheard, today's gun violence are the screams of the unheard. This white paper outlines an ecological approach to the study of urban violence that takes into full consideration the role played by historical policies and current urban transformations. Our ecological approach employs 21st-century cyberinfrastructure to capture the often-unheard stories, misunderstood motivations, and underappreciated strains and adaptations in urban areas and to partner with urban residents in the creation of science, i.e., theory, data, and empirical scholarship.

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Moving Forward in Organizational Science

White Paper ID 190

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Abstract: Organizational science (OS) shares problems and concerns with the wider class of SBE sciences. Chief among those is that few research findings published in academic journals end up applied in practice. In contrast, fast-moving engineering or medical research that shows up in scientific journals is eagerly absorbed by commercial R&D practitioners. Managers, too, feel compelled to solve problems in a harsh, competitive environment. Unfortunately, social sciences aim at studying problems, not solving them. Lacking a sound OS body of knowledge, managers jump from one fad to another. Researchers build statistics-based models to describe past behaviors. Instead, managers need research models that deal with future, expectable or intended behaviors. A science maturity framework helps put this need in perspective and provides guidelines for future education. Doing business transformation by design, not by trial and error, requires more accurate technical terminology, an enlarged range of modeling research tools (including, say, system dynamics), and improved schematic communication standards (with, say, UML). Management is an applied, experimental activity. OS research is not experimental. . . . yet. It is managers, not researchers, who take risks when applying research findings. Managers don't learn experimental methods at school. But they might. Simulation-based laboratories are an example.

Gender, Migration, and the Challenge of Global Policymaking for Social Care

White Paper ID 174

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Abstract: Social care -- the care of children, frail elders, the disabled and chronically ill -- has emerged as a key issue in contemporary social policymaking in both developed and developing societies around the globe. Increased female labor force participation, in combination with declining birth rates and rapidly aging societies, has undermined the conventional definition of care as unpaid work for women. Instead, care is increasingly being provided through public institutions or the market. In the view of policymakers, the scope, nature, and quality of social care services, as well as the conditions of those providing care, are linked to goals such as gender equality, intergenerational justice, global equity, and the development of human capital. Previous scholarship, based on the premise that social care policies are set primarily at the national or local level, has generally analyzed social care policymaking country by country. Future research, however, must be conducted on the assumption that the challenges facing social care policymakers are global and thus require a transnational approach for full understanding and appropriate governance. A Comprehensive research agenda in this field would draw on (and help develop) several strands of scholarship: feminist comparative social policy analysis, migration studies, labor studies, global economics, and studies of global governance.

The Evolution of Natural Computation, Behavior, and Instinct, and the Need for Mathematical Modeling and Mathematical Literacy in the Social, Behavioral, Cognitive, and Economic Sciences

White Paper ID 219

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Abstract: There is a significant gap between existing knowledge of natural behavioral computation and the biochemistry of how a brain performs such calculations. For example, linguists can describe human languages, but little is known about how the brain performs the relevant computations in a social context. There is also a gap between abstract models of evolutionary theory and the mechanics of gene interpretation into computing organs. That is, although there are models of how language might be favored by natural selection, the intermediate steps leading to human-like communication instincts are not known. Researchers in the fields of social, behavioral, cognitive, and economic sciences can contribute to filling this gap by working in conjunction with mathematicians to formulate and study models and simulations. To do so, these fields will need become more open to unconventional mathematical methods, engage in interdisciplinary projects with mathematicians and computer scientists, and develop more mathematical expertise among their practitioners. I summarize an example interdisciplinary project on the evolution of serial coding and suggest mathematical subtopics of particular use for modeling in these fields. I recommend that support be given to interdisciplinary projects, workshops, publications, and educational programs.

A New Household Panel for the U.S.

White Paper ID 168

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Abstract: This white paper argues that a new long-term household panel would be foundational and transformative both to economics and related social sciences. (1) The important questions are the major ones concerning economic and social dynamics in the U.S. What are the causes of economic and social disadvantage? How have the dynamics of demographic behavior changed over time and what are the reasons for these changes? How do U.S. workers labor market outcomes evolve over their lifetimes, and what policies might the U.S. society follow to address those challenges? What are the contributors to disadvantage during childhood and how does childhood disadvantage affect later life outcomes? How important are schools, neighborhoods, and other social groupings? Economics, sociology, and related disciplines have long studied these questions.(2) Current understanding both of trends and of their causes and implications is poor, and one of the major reasons lies in limitations in the U.S. data infrastructure. A major investment in new data infrastructure is needed to provide the capability for new research and to inject new energy into social science research on the questions. Such an investment would have enormous payoffs to the research community, including educators and students, as well as to policy makers.

Economics, Climate, and Values: An Integrated Approach

White Paper ID 176

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Abstract: How can we integrate the role of values and ethics in economic analysis of climate change without sacrificing the positive aspirations of that science? Given the urgency of the measures required by climate change, economic analysis has never been as important as it is today. And given the necessity of value judgments in economic analyses of policy options, the tension between fact and value has never been more conspicuous. But while significant strides have recently been made in the understanding of both the inadequacy and impracticality of a fact/value dichotomy in scientific research, many in economics seem to continue to adhere to outmoded (and now clearly inappropriate) images of science. The net effect has been to undermine the usefulness of economic advice to policy makers. The ideal of objectivity to which economists aspire needs to be reframed and broadened in ways that take advantage of new resources from the philosophy of science, environmental philosophy, and other

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social sciences. Ultimately, changes in the education of young economists, as well as in patterns of support for practicing economists will be necessary to effect a shift to an ideal of objectivity in which the role of values can be properly integrated.

Complex, Global-Scale Security Challenges Require Enhanced Scientific Infrastructure

White Paper ID 165

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Abstract: The United States confronts numerous security challenges stemming from social dynamics at the global scale. Solutions to these challenges, and to their root causes, will only be partly technological. Rather, such problems are rooted in the individual psychologies of individuals; in the dynamic interactions of these individuals within groups; in the interconnected institutions (political, economic, etc.) emerging from, and constraining, these individuals and groups; and in the regional and global connections among larger polities (e.g., states, alliances) within which these institutions exist. The solutions to security challenges are thus likely to depend on improved understanding of complex social human dynamics. I propose (1) a specific program dedicated to supporting social-behavioral approaches directed towards security issues, (2) the allocation of funds generally dedicated generally to encouraging and facilitating multidisciplinary work in the social and behavioral sciences, and (3) the creation of a global data-gathering infrastructure -- similar to the climate-focused NEON program for researching important, challenging questions of human behavior -- and social dynamics. Such investments would advance fundamentally important SBE science and enhance the scientific infrastructure for doing so.

What Power the Administrative State?

White Paper ID 12

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Abstract: The administrative state is a term coined to denote the vast network of agencies that carry out law. As society has grown more complex, so too has government expanded in its attempt to intervene in the many varied situations in which we find ourselves. An outgrowth of those attempts is the concomitant growth in the administrative agencies of government to level as yet unseen by modern societies. The number of agencies and organizations, their expanded jurisdictions into new areas of life, and their increasingly final controls over events coupled with lack of legislative oversight, media abdication of reporting, and public ignorance of administration combine to elevate the unbridled power of the administrative networks to a danger level capable of altering the course of nation states and of contributing to the decline of free societies. Social science disciplines thus have a grand challenge before them to structure and guide the debate over the proper balance of administrative power before they too lose their right to address the question.

Some Foundational and Transformative Grand Challenges for the Social and Behavioral Sciences: The Problem of Global Public Goods

White Paper ID 127

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Abstract: Because of economic growth, globalization, and rapid technological change, many of humanity's major concerns are ones that arise on a global scale. A particularly dangerous syndrome is global public goods, which involve processes that adversely affect the entire globe in an indivisible manner. Important examples are global warming, ozone depletion, financial crises, cyber warfare, and nuclear proliferation. The mechanism underlying the problems of global public goods is the absence of political or economic mechanisms that can deal effectively and efficiently with these issues. The grand challenge for the social and behavioral sciences is to devise mechanisms that overcome the bias toward the status quo with respect to life-threatening

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global issues. This will involve two separate areas: to develop analytical approaches that can explain the syndrome and develop mechanisms to curb the problems before they become dangerous; and to encourage interdisciplinary programs that link together local knowledge about particular problems and the analytical knowledge of potential solutions.

Public Science: A Call

White Paper ID 192

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Abstract: One of the great challenges before the sciences in the 21st century is to conceptualize and put into practice public science. The two models of publicity pervasive among the sciences today, access and impact, are insufficient models for addressing national and global crises. A public science will need to let science itself be formed by the norms and practices of publicity, namely visibility before broad audiences and debate and discussion by publics. The challenge question, what constitutes public science ?, can be broken into sub-questions in the areas of knowledge, authority, education, communication, and society.

Understanding the Physics of the Mind: A Proposal for a Perceptual Science Initiative

White Paper ID 238

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Abstract: Today, perceptual science is standing at the threshold of producing paradigm-shifting discoveries and transformative knowledge with implications in domains of critical national interest, such as education, medicine, health sciences, bioengineering, computer science, robotics, economics, among others. Perceptual science has the promise to be both significant and influential, in part because advances in its understanding have often been the gateway for new technologies (e.g., brain machine interfaces), but also because new ideas in perception often resonate with other fields like computer vision, neuroscience and robotics. The field has reached a level of maturity where fundamental research and extraordinary resources will revolutionize how we understand our interface with the outside world. Accelerated progress in the field will require fuller integration between all related areas of investigation, including the creation of laboratories and funding mechanisms specifically designed to foster integrated research.

Understanding the Impact of Nonlinear Dynamics on the Processes of Human Systems

White Paper ID 100

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Abstract: The global economic collapse of the fall of 2008 underlined in a powerful way the degree to which nonlinear dynamics influence processes in human systems. As a way of understanding these influences, this paper proposes geographically-integrated history (GIH) as an interdisciplinary research strategy. GIH asserts that (1) the understanding of historical processes requires an integration of the natural, social, and cultural environments on the basis of place, space, and time, and (2) accomplishing this integration poses a challenge that can be met with modern computational tools, especially dynamic forms of geographic information systems and social network analysis, and visualization techniques. The paper explains how GIH demands the integration of a broad range of disciplinary approaches and provides opportunities for generating truly new, transformative scientific ideas.

Complexity in Social Political and Economic Systems

White Paper ID 97

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Abstract: We live in a time of rising complexity both in the internal workings of our social, economic and political systems and in the outcomes that those systems produce. Increasing complexity has implications for social science: it hinders our ability to predict and explain and to prevent large deleterious events. To make headway on the problems that animate social and behavioral scientists: economic inequality, health disparities, achievement gaps, segregation, climate change, terrorism, and polarization among voters we must acknowledge their complexity through interdisciplinary teams. Harnessing complexity will require several changes: we must develop practical measures of social complexity that we can use to evaluate systems; we must learn how to identify combinations of interventions that improve systems; we must see variation and diversity as not just noise around the mean, but as sources of innovation and robustness; and finally, we must support methodologies like agent-based models that are better suited to capture complexity. These changes will improve our ability to predict outcomes, identity effective policy changes, design institutions, and, ultimately, to transform society.

Information and Technology: Improving Public Sector Capability to Address Societal Challenges

White Paper ID 302

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Abstract: This paper argues for a dedicated, social science-based research program to address the question: how do the societal context and institutional character of government interact with emerging information and communication technologies to shape the capabilities and performance of the public sector? The ability to answer this question can only result from non-domain specific research that studies the societal context of government and the information resources and technologies affecting government. Because of government's inherent complexity and unique role as the leader in addressing the world's grand societal challenges, there is an urgent need to understand the practice context of government and how it influences the policy, management, and organizational political, and public factors that shape information use and IT applications. Currently there is a lack of research on the public sector, and while there are devoted resources to government areas, there is little scientific attention to the government organizations and processes that are both the sources and customers of the programs. With focus on this cross-cutting research, government can improve it's capacity to serve society, and researchers can seek opportunities for new theory development that links government context to the fundamental questions of organizational and technical action.

Sustainable Forestry and Holistic Analysis

White Paper ID 144

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Abstract: How do we separate "data from wisdom"? (E.O. Wilson) -- How does science incorporate environmental, economic and social implications (triple bottom line - Montreal Protocol) into research questions with life cycle and holistic analysis? What constitutes "social relevance" as it is reflected in our scientific process and analysis? What values do our research questions represent? How is science leading us to a sustainable and stable society, or is it? When we look back at forestry science, what wisdom becomes evident? How do we analyze the effects of past management in terms of causes and effects? How can we insure our connection and focus toward wisdom which is the web of ecosystem services and our sustainable place within that web? I offer my work with selective harvesting; local processing, and end-product forest management as a model of sustainable forestry. This constitutes a return to the

mission of Gifford Pinchot, "to provide the greatest good for the greatest number for the longest time." I suggested a challenge, my model against the Industrial model in terms of jobs, healthy rural communities and healthy ecosystems in exploring the context of social relevance to the H.J. Andrews experimental forest with vague interest. Can we do better?

Networks of Action in Social Science Research

White Paper ID 102

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Abstract: Social and economic research has traditionally focused on familiar units of analysis, such as individuals, groups, and firms. In this white paper, I suggest that networks of action might provide a fruitful addition to our repertoire as a basic unit of analysis in social and economic research. A network of action can be used to represent recognizable, repetitive patterns of interdependent actions, typically carried out by multiple actors. Such patterns are the foundation of economic organization (e.g., organizational routines) and social institutions in general. Two current trends make research on action networks feasible: (1) ongoing improvement in our tools for pattern recognition and network analysis; and (2) increased availability of data that results from digitization of economic and social processes. Reversing figure and ground, and focusing on actions, rather than actors, provides an opportunity to address social and economic research from a new perspective.

The Role and Potential Impact of Social, Behavioral, and Economic Science Approaches to Networks in the First Half of the 21st Century: Grand Challenges of Substance and Methods

White Paper ID 243

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Abstract: The last decade has witnessed a path-breaking convergence between natural/physical, computing, and SBE sciences in the adoption of a network approach to understanding phenomena from protein structures to global transportation connections. Although social sciences have been involved in the study of networks for nearly a century, recent innovations have come from physics, cognitive, computer, and information sciences. While promising, the integration of insights from SBE sciences into the new network science is far from complete, not yet incorporating the full range of ideas and approaches. We introduce three grand challenges that stand in the way of network science's potential to unlock the fundamental workings of natural, social, and artificial systems.

Data Driven Discovery in the Social, Behavioral, and Economic Sciences

White Paper ID 209

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Abstract: With the advent of petascale computing, the social, behavioral, and economic (SBE) sciences have an opportunity to transform their research and move away from the limits imposed upon them by the current state of the art in technology. Central to this paradigmatic shift, however, is the need for SBE researchers to confront the grand challenge question, how can the social, behavioral, and economic sciences harness vast stores of digital data for scientific inquiry? This white paper proposes the development of a new type of inquiry, data driven discovery (D3), which will integrate the capacity to collect and analyze huge digital datasets, analytics to uncover patterns and relationships, and rigorous theory. Central to this program is the need to develop new models for how to manage and analyze the large amounts of data available to

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researchers. Advancements are proposed for acquiring data, analytics, and conduct of research to allow scholars to address complex issues that currently challenge research and that will allow them to make transformational discoveries in their research and scholarship.

Research Opportunities: Financial Economics, Public Finance, Energy Markets, and an Aging Society

White Paper ID 126

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Abstract: The remarkable events in the global economy in the last two years have drawn attention to the central role that economic institutions and economic policies play in determining the well-being of virtually all participants in modern industrial societies. The global financial crisis has raised a number of research opportunities, in both financial economics and public finance. At the same time, while attracting less attention, recent developments i in energy and environmental policy, and the gradual aging of the U.S. population, have also opened rich opportunities for future research. This brief paper outlines potential research directions in each of these areas.

Discovering Human Brain Specializations

White Paper ID 173

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Abstract: The last decade has witnessed the emergence of a new science of human brain evolution. This science has the potential to fundamentally alter our understanding of human nature by providing a detailed account of how the human brain differs from those of other species in its connectivity, microanatomy, and functional capacities; by elucidating the genetic underpinnings of those differences; and by determining how human-specific phenotypes emerge during individual development. The new science became possible with the advent of experimental methods that do not require invasive or terminal procedures, such as non-invasive neuroimaging and comparative genomics. Advancing this science will require new training programs that cross traditional disciplinary lines to include primatology, human evolution, neuroscience, cognitive science, and comparative molecular biology. Moreover, because comparing humans to our closest relatives -- chimpanzees and other great apes -- is essential for understanding human brain evolution, and because great ape populations are rapidly dwindling, a high-priority program should be established to acquire and archive the materials required to advance the science. This would entail, at minimum, imaging as many apes as possible with current technologies, scanning existing and future collections of histological sections, and making those images available through the Internet.

A Distributed Architecture for the Documentation of Language and Culture

White Paper ID 63

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Abstract: The flat earth that Thomas Friedman describes is rapidly leveling linguistic and cultural variation. Half of the world's 6,000 languages are moribund. Only 600 languages may remain by the end of this century. There is a critical need to document the linguistic and cultural variation that presently exists before it disappears forever. This goal requires the development of new tools and processes to record, preserve and share as much of the human intellectual genome as possible. Advances in networked communications now

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enable investigators around the world to construct a distributed archive of linguistic and cultural data. A distributed archive would allow linguistic experts to share ideas and procedures for documenting linguistic features. A shared archive would flag areas in urgent need of documentation. The individual researcher would have access to models of the best practices in the field. A distributed archive would allow native speakers to make their own contributions and search for new ways to preserve their language and culture. An open archive has obvious applications across the social sciences. Its chief advantage is that it would allow social scientists to document a wider array of human behavior while giving subjects a role in documenting their own lives.

Enabling Game Science Research for Transforming Regional Economic Development Policy in United States of America for the Early 21st Century

White Paper ID 210

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Abstract: For purposes of this paper, game science is defined as the strategic study of environmental, economic and/or social situational world qualified by explanations and/or predictions made by economic practitioners establishing postulated theorems based upon player interaction with the games of policy development and management. When these practitioners actively apply sustainable development principle to measures of economic effectiveness for social, behavioral and economic elements within their economic system of influence, they have the greatest ability to stimulate innovation and prosperity . Specific to the authors focus, this paper attempts to establish requirements for NSF research funding in building the bridges between game science, national (ocean) policy, regional governance and (ocean) economic development fostering sustainable (ocean) system prosperity. if game science bridges can be strategically built short-term, future regional ocean partnership funding is streamlined long-term. game science must drive innovation and be regionally identifiable for determining multi-level process efficiency. Concepts herein are explained by terms of the statistical process and not mathematical attribute for benefit of the game theory unfamiliar reviewer. This paper establishes a requirement for establishing NSF regional game science funding for perpetual economic science research as applied to policy development for creating a better social economic efficiency.

Three Challenges for Macroeconomics

White Paper ID 185

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Abstract: I discuss three outstanding challenges for economic research that I hope will be addressed over the next decade. First, research must try to understand whether increased government spending through social transfers is an effective tool to lower unemployment and raise output during recessions. Second, the explosion of information technologies in the last decade should lead researchers to develop sharper and testable models of why people act inattentively, as if they had only very limited information. Third, a new system of national accounts and measurement of inflation are needed to capture the richness of the 21st-century economy.

The Brain and Human Behavior: The Neuroscience/Social Science Nexus

White Paper ID 14

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Abstract: The brain has become one of the iconic boundary objects in 21st-century science, claimed as a key material or symbolic resource across the disciplines. Brain researchers have traditionally assumed that individuals and brains can be studied independently and in isolation from social, cultural and historical contexts. Theories about theory of mind have followed the same individualistic pathway. Challenges to these ideas have been accumulating for at least the last 30 years in brain and mind studies. More recently, there has been a turn to the social in the neuro- and life sciences driven in part by (1)

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pioneering research in neuroscience on the plasticity of the brain and neuronal regeneration, and (2) a growing sensitivity to society, world, and environment as contexts for the actions of the brain and mind. The more extreme isolationist ideas are increasingly yielding to sociological and anthropological perspectives and concepts. As early as 1980, Maturana and Varela were suggesting an appropriate model in this context that treated the brain as an aggregated system of social and biological systems. This white paper argues for dedicating resources to fostering social research on the brain and strengthening the neuroscience/social science nexus.

The Long Now: Revolutions in Knowledge Production and Exchange in the 21st Century and the Need for Large-Scale, Long-Term Qualitative Research of Sociotechnical Systems

White Paper ID 262

Abstract: Today, knowledge production and sharing are being transformed by sweeping changes in information technology, market relations, and patterns of collaboration. The grand challenge for qualitative research of sociotechnical systems is to match such global transformations by moving beyond single-scholar one-off research ventures to communal data sets that can be easily shared between investigators, across generations of scholars and in comparative analyses. This document presents seven steps towards the creation of a facility or institution in support of large-scale, long-term qualitative studies of sociotechnical systems.

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Transforming Education through Scientifically Rigorous Intervention Approaches: A Call for Innovations in the Science of Emotional Intelligence

White Paper ID 215

Abstract: John F. Kennedy said, "Let us think of education as the means of developing our greatest abilities, because in each of us there is a private hope and dream which, fulfilled, can be translated into benefit for everyone and greater strength for our nation." Scientific innovation and economic stability are dependent upon the success of the educational system. Therefore, the directorate should consider education in developing its 2020 scientific agenda. Current educational practices do not address the developmental needs of the whole child and must be transformed to include opportunities for advancing cognitive, social, and emotion skills. Emotional intelligence (EI) theory proposes and research confirms that together, these skills are vital for success in school and in life. We ask the directorate to support advancement in the science of EI and suggest three pathways for innovation: constructing assessment tools to examine the development and influence of EI, evaluating how to cultivate emotion skills through educational practices, and conducting research on how to enhance learning environments through comprehensive training of educators in the service of nurturing the whole child. Investment in these scientific endeavors will empower children to reach their fullest potential and through their contributions, benefit and strengthen our nation.

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Evolving Research for the Social, Behavioral, and Economic Sciences of NSF

White Paper ID 68

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Abstract: This paper discusses the need to develop teams of people who can work together to design methodologies and analytic strategies to simultaneously address individual, team, managerial, organizational, regulation, political, etc. potential causes of all kinds of outcome variables. Here, the focus is on crisis prevention and mitigation, but the same discussion holds for other outcomes. The range of disciplines needed to answer macro questions about crisis prevention and mitigation is broad, depending on the issues addressed by the study. Almost every question one could imagine concerning how systems of organizations contribute to failure is still left to be answered. BP's failure in the Gulf of Mexico gives us many examples such as what were the barriers to success caused by each of BP's constituents (MMS, Halliburton, Transocean, etc.)?

A Research Agenda in Economic Diagnostics

White Paper ID 31

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Abstract: Very little research is devoted in economics to "economic diagnostics": figuring out which among multiple plausible models actually applies in a particular setting. The profession places a large premium on developing new models that shed light on as yet unexplained phenomena, but no-one gets brownie points for research that informs how appropriate models and remedies can be selected in specific contexts. With better diagnostic tools, perhaps economists would have been more skeptical of applying perfect-information, zero-agency-costs models to the U.S. prior to the financial crisis. Different economies suffer from different constraints, and the appropriate models and remedies depend on the nature of the more binding constraints. Diagnostic research can help us figure out how to apply economics in different settings in an intelligent way.

Three Challenges Facing Modern Macroeconomics

White Paper ID 52

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Abstract: There are three great challenges facing researchers in modern macroeconomics today, all brought into sharp relief by the recent financial crisis. The first is to find more realistic, and yet tractable, ways to incorporate financial market frictions into our canonical models for analyzing monetary policy. The second is to rethink the role of countercyclical fiscal policy, particularly in the response to a financial crisis where credit markets seize. A third great challenge is to achieve a better cost-benefit analysis of financial market regulation.

Insightfully Linking 21st-Century Learning to the 21st-Century Economy

White Paper ID 166

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Abstract: We propose a grand challenge of insightfully linking a 21st-century view of how people learn to a 21st-century view of how people contribute to a thriving economy. A widespread belief that education drives economic growth underlies policy decisions, research programs, and educational reform efforts. While valid in the most general sense, the underlying research on education and the economy is out of sync with the last two decades of learning science research and only superficially engaged with recent analyses of the drivers of economic growth. Consequently, the research base is too weak to derive theories of action that guide educational interventions, other than the bland

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admonishment to raise test scores. The National Science Foundation would be especially well poised to address this grand challenge in the important context of how the nation produces a pipeline to STEM talent to drive innovation and growth of scientific knowledge; this context is core to NSF's mission. We see the need for a new transdisciplinary research program that would address this grand challenge by engaging economic and learning scientists along with domain scientists who are concerned with the next generation of leaders.

Market Design: Understanding Markets Well Enough to Fix Them When They're Broken

White Paper ID 107

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Abstract: In the past fifteen years, the emerging field of market design has solved important practical problems and clarified both what we know and what we don't yet know about how markets work. The challenge is to understand complex markets well enough to fix them when they're broken, and implement new markets and market-like mechanisms when needed. Among markets that economists have helped design are multi-unit auctions for complementary goods such as spectrum licenses; computerized clearinghouses such as the National Resident Matching Program, through which most American doctors get their first jobs; decentralized labor markets such as those for more advanced medical positions and for academic positions; school choice systems; and kidney exchange, which allows patients with incompatible living donors to exchange donor kidneys with other incompatible patient-donor pairs. These markets differ from markets for simple commodities, in which, once prices have been established, everyone can choose whatever they can afford. Most of these markets are matching markets, in which you can t just choose what you want, you also have to be chosen. One of the scientific challenges is to learn more about the workings of complex matching markets, such as labor markets for professionals, college admissions, and marriage.

Real-World Speech Recognition

White Paper ID 55

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Abstract: Speech recognition would seem, to many, to be a scientific/technical problem that has been solved. Inexpensive recognition systems are commonly available for personal computers and mobile devices. Why then is the use of such a potentially enabling technology not as ubiquitous as past predictions would have led us to believe? Note that I have typed this into my computer, not spoken to it. One rarely sees people talking to their computers, unless they are skyping, although the recognition (talking typewriter) technology supposedly has been mastered. Unfortunately, recognition performance is severely limited by real-world constraints. Ambient noise, variability in the clarity of a speaker's voice due to age, speaker style, infirmity, and a host of other conditions limit the practical and reliable use of speech interfaces. Speech is more informal and capricious than algorithmic approaches are designed to handle. In addition, we help disambiguate such ephemeral information by using as many contextual, communicative cues as are available to us, including facial information, gesture, indications of emotion, and situational indicators. The challenge is to mount a sustained, focused effort to develop recognition systems (speech, gesture, facial information, emotion, semantic, etc.) that work reliably in real-world conditions, from the workplace to the battlefield.

Parent Involvement and Kindergarten Readiness: An Approach for Success

White Paper ID 140

Abstract: Each year in the United States, thousands of five-year-old children arrive at kindergarten unprepared to achieve the educational goals established by their state boards of education. The calculated costs of school unreadiness to society are staggering. However, comprehensive early childhood and family involvement programs can save society billions as well as provide children with

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a secure future. Because families serve as children's first and most influential teachers, family members can take the lead in providing children with the experiences they need to succeed in school. We are proposing to address the problem of kindergarten unreadiness with a multifaceted family involvement model. This model would include direct services to children, family involvement in education, and teacher participation in family involvement. Research, however, is required to determine the characteristics of successful pre-kindergarten and family involvement programs, family recruitment and retention strategies, and teacher education and preparation as they apply to kindergarten readiness.

Understanding Learning in Organized Settings

White Paper ID 208

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Abstract: In this white paper, we propose building an interdisciplinary community to conceptualize and study the relationship between learning and the social contexts provided by formal organizations, such as schools and out-of-school learning environments. Learning scientists agree that social contexts exert profound influences on learning. Formal organizations dominate the social landscape of modern societies, including their educational functions. Consequently, learning scientists and organization scientists are beginning to recognize the need to construct a conceptual and empirical bridge that links the immediate contexts where learning occurs to their organizational settings. We briefly summarize key contributions of the learning sciences and consider what two perspectives on organizations -- contingency theory and institutional theory -- reveal about the influence of task and external environment on the formal structures of organizations. We conclude by discussing the implications of this cross-disciplinary agenda including the development of an integrated body of theory guiding empirical work, as well as principles for the redesign of educational organizations.

Neuroplasticity, Meditation Training, and The New Mind

White Paper ID 204

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Abstract: There is growing consensus in cognitive neuroscience and psychology that the brain and mind are plastic, but the limits of neuroplasticity are unknown. It is time for a new mind-brain science supported by rigorous interdisciplinary empirical investigation to determine how training the mind changes the brain. The growing field of meditation research has yielded promising findings, but several questions remain concerning the underlying processes and the limits of observed benefits of meditation training. To address those issues, we propose a paradigm shift from an almost exclusive use of third-person assessments (by outside observers using physical measures) to a more synergistic approach integrating first- and third-person assessments of meditation training in experimental contexts. The challenge is to document, rigorously and systematically, what people actually do during meditation, given the instructions they receive, and then relate first-person assessments to previously validated objective measures. We explain why this challenge question is important while framing the longstanding issues of meditation research in a more scientifically tractable manner. The synergistic approach we advocate here will benefit both basic and applied science by illuminating the mechanisms of mind-brain plasticity and guiding development of practical tools for use in clinical and secular educational, workplace, and community contexts.

Future Research in the Social, Behavioral, and Economic Sciences

White Paper ID 111

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Abstract: This paper describes a research program organized around the theme of What Makes Societies Work? There are two stages. The first is a study of how context and institutions affect people's incentives. Why do people's preferences appear to be helpfully prosocial in some settings and narrowly self-interested in others, and how can we design interactions to amplify the former? Why are institutions such as constitutions and courts effective in shaping social behavior in some settings but not others? Why are the relational incentives created by repeated interactions more effective in some settings than others? Addressing these questions will take a concerted effort on the part of economists and others from across the range of social sciences. Next, these insights are to be put to work in addressing questions of how we can influence or design social outcomes. How do we achieve a consensus on using future interactions to create current incentives? What institutions can we design that will induce people to coordinate on contributions to the public good rather than hoarding private wealth as the route to status? Questions such as these are fundamental to making economics and social science more generally a useful part of our intellectual arsenal.

Future Research in the Social, Behavioral, and Economic Sciences with the Panel Study of Income Dynamics

White Paper ID 237

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Abstract: There are extraordinary opportunities to address the next generation of research challenges in the social, behavioral, and economic sciences that build on the Panel Study of Income Dynamics (PSID). First, PSID offers untapped opportunities to examine questions of relevance to our understanding of environmental sustainability. Second, cross-national harmonization of PSID with other national panel surveys will be instrumental for developing and facilitating new research on the effects of policies and institutions. Third, measuring genetic information in PSID will open a wide range of new studies on social and economic behavior and outcomes. Advances in these areas will provide a foundation for future research and for new interdisciplinary collaborations.

The Creativity Initiative: An Interdisciplinary Science of Creativity and Innovation

White Paper ID 77

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Abstract: Our political, scientific, and educational leadership has come to a firm consensus: creativity and innovation are essential to the social and economic future of the United States, particularly in STEM disciplines. But we do not yet have a complete understanding of how to identify and develop creativity. How can we best foster creativity in our country's K-12 and university students? How can we maximize the nation's innovation potential, to result in maximum economic and social benefit? I propose a major interdisciplinary research effort, the creativity initiative, to build on previous research findings in psychology,

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education, anthropology, economics, organizational behavior, computer science, sociology, and neuroscience. This white paper describes the state of existing scientific knowledge, existing NSF programs related to creativity and innovation, a list of potential interdisciplinary research efforts and how they would build on existing knowledge, and standing questions in the field that the creativity initiative is designed to address.

Sustainability of Social Systems by Suppleness

White Paper ID 284

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Abstract: This white paper proposes that one of the next grand challenges in the social, behavioral and economic sciences is to understand mechanisms of how dynamic meta-states of a complex system may be sustained through continual adaptive changes, or "suppleness," and to investigate how one could implement such mechanisms in our social, economical and political systems to achieve or enhance their sustainability. The idea of sustainability by suppleness is foundational because it is fundamentally different from existing ideas of sustainability by robustness or resilience. It is also transformative because it may provide novel perspectives to many of today's socio-economical and socio-ecological problems that call for new strategies to cope with inevitable environmental changes.

An Integrated Millennial and Centennial History for Our Present and Future

White Paper ID 48

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Abstract: What will the world be like in 2050? Some have stated that these next 40 years will be crucial to our survival as a species striving for a just and civilized world, given escalating deleterious changes to our environments and the resources on which we have grown dependant. The biophysical scientific community will continue to work hard to find technological fixes and will surely produce applicable deliverables. But there are those unintended consequences always. The proposed approach argues for identifying a few regions globally and working with several disciplines inclusive of anthropological archaeology and its understanding of past life ways and social institutions to meaningfully model explanations for our culminating cultural present. What were the social adaptations made to changing environmental conditions, and in turn, how have societies reacted to their own changing trajectories? What social structures and environmental conditions have allowed and continue to allow long-term resilience. We provide a focused introduction to one region of the world -- the ancient Maya Lowlands of the Yucatan Peninsula. The methods suggested for examining the Maya region have been initiated, and we see a fundamental role for graduate training in expediting the kinds of information and knowledge required.

Social/Behavioral Science or Psuedoscience?

White Paper ID 22

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Abstract: In many social/behavioral explanatory (causal) studies, the effect sizes appear to have been near zero for many years and are not increasing in several fields of study. Reviews of effect sizes in one field, self-esteem (some 20,000 that used standardized scales), provide an example (Scheff and Fearon, 2004). Between 1976 and 2004, there were four reviews of the entire field, and 24 reviews of subfields, a total of 28 assessments. All of them found near zero effect sizes for predicting behavior. The lack of any increase in those 28 years also suggests zero progress in these studies, and zero monitoring of findings by funding and other agencies.

Hierarchical Knowledge Relations and Dynamics in the "Tower Of Babel"

White Paper ID 132

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Abstract: Acknowledging that the digital divide is becoming more of a knowledge divide, we invoke an image of the "Tower of Babel," evincing a vertical hierarchy of information and relations in which access to the top tiers is highly limited. Depicting the knowledge society itself, which encompasses a highly complex interconnected system of digital networks within which interaction among social actors occur and from which knowledge is created and diffused, we emphasize networks as a central factor determining access and posit the broader notion of the digital knowledge network divide (DKND) to better understand related structures and dynamics. In the face of concerns over democratizing trends and, more, general calls for expanding the science and technology workforce and increasing scientific literacy, access to knowledge is critical. Accordingly, an important challenge for the years to come will be to characterize the evolving and unique landscape of the knowledge society in order to inform and design effective policies and programs. Related research will require the development of measures and tools that capture the hierarchical relations and dynamics of the DKND and that, ultimately, will allow for the assessment of related spatio-temporal disparities and the determination of indicators of network connectivity to measure changes in overall access and participation in the knowledge society.

A Grand Challenge: Shaping the Government of the Information Age

White Paper ID 303

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Abstract: Government in the information age must act and react swiftly to the complex problems faced by society. In the Information Age, governments are also under greater scrutiny. In response, government must be more flexible, agile, informed, transparent, and inclusive than ever before. Yet, despite recent advances in modernizing government practices, today's governments have not taken full advantage of many opportunities made possible by information technology and are not ready to meet the challenges of the information age. Shaping government to be flexible, dynamic, and technologically innovative is a grand challenge that involves the collaboration and joint effort of multiple academic and practice disciplines. The gaps in what we know about government itself as an institution and how information and technology interact with the institutions of government are great. To fill these gaps we propose a 10-year/$250m program to develop the academic domain, its capacity, critical mass, and infrastructure. Centers of excellence in teaching and research (COEs) are needed to create, disseminate and employ smart information, leverage social media to engage citizens, and help transform the practice of government.

Representing the Digital Government Society of North America

Predictive Models for Political Instability

White Paper ID 157

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Abstract: Over the past decade, two very large-scale U.S. government projects -- the multi-agency Political Instability Task Force (PITF) and DARPA's Integrated Conflict Early Warning Systems (ICEWS) -- have invested tens of millions of dollars in the development of statistical early warning systems for forecasting a variety of measures of political instability. While both systems have had considerable input from political scientists, there has been little interaction between this work and NSF-funded academic research. PITF and

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ICEWS have been very successful in demonstrating that we now have sufficient data and appropriate statistical methods to create forecasting models that have substantially higher out-of-sample accuracy than traditional expert forecasting, but a substantial number of basic research questions remain unanswered. These include development of ensemble methods for the integration of multiple models, further work on statistical time series and pattern recognition models, assessing causality and counter-factual inference issues, and integration of qualitative assessments into the quantitative models. These basic research issues cross a number of disciplinary and substantive boundaries, would contribute substantially to the intellectual infrastructure in the field, and assist in the transfer of this U.S. contract research to both the academic methodology community and the larger non-governmental organization community.

Philosophy of Scientific Political Inquiry for the 21st Century: Five Questions in Search of Research

White Paper ID 197

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Abstract: Over the past two decades political science, while making considerable strides in the systematic collection of data and the formal specification of theories and models, has settled into a dysfunctional reliance on a narrow set of methodologies based on incomplete and logically inconsistent behavioralist philosophies from the 1920s and 1950s. A decade ago, NSF attempted to address this problem through a series of studies, and as a result made a substantial investment in the Empirical Implications of Theoretical Models (EITM) program. EITM, however, has proven to be a weak foundation which largely reinforced, rather than addressing, the fundamental problems in the existing paradigms, and has had virtually no discernible effect on either the practice or scientific status of systematic political inquiry. This white paper proposes that over the next 10 years, investment is needed in more radical considerations of fundamental philosophy of science issues -- specifically causality, statistical inference, integration of qualitative and small-sample research, and stochastic modeling -- to provide a solid foundation in core philosophies of inference that are appropriate to the 21st century.

Studying Educational Design: The Underexplored Tipping Point

White Paper ID 175

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Abstract: We have an educational environment that is failing more students than it supports. We have increasing divisions across levels of social and behavioral sciences, which narrows the range of transfer of theories and methods. New theoretical and methodological combinations across previously unconnected disciplines in the social and behavioral sciences can produce massive growth in basic scientific theories and practical applications. However, interdisciplinary collaboration requires bridging goals, values, and language differences. Educational design, the process by which educational materials, programs, processes, and policies are (re)designed and developed, has received little prior attention from any research community. We argue that educational design is a critical, rich, but sufficiently focused topic that can serve as a multi-level integrator of the social and behavioral sciences. Such integration could have transformative effects on these sciences as well as on educational environments in the U.S.

Long-Term Consequences of Modern Military Service

White Paper ID 184

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Abstract: What are the long-term consequences of serving in a modern, all-volunteer military? Contemporary research has not had access to sufficiently powerful and timely data to help us analyze the impact of military service on those sent by the United States to conduct our current military campaigns. The armed forces are the largest single employer in the nation, employing nearly 2.5 million people between the active and reserve forces. The social scientific

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community should support a large-scale longitudinal data collection effort to systematically capture information about a population too often marginalized from national surveys using the civilian population as a sampling frame. Such data would have long-lasting and far-reaching consequences for research in sociology, demography, economics, and psychology. We now have a new generation of combat-experienced war veterans and their families re-integrating into a society that has very little data available to study and understand that process.

Transnational Research in the Social Sciences

White Paper ID 199

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Abstract: This white paper calls for a new emphasis on what I term transnational comparative approaches in the social sciences. Applicable to a wide range of social science fields, these approaches combine comparison of subnational units with comparison between distinct national contexts. In such diverse fields as urban studies, federalism, regional political economy, immigration, disaster relief and social movements, transnational research can extend existing knowledge beyond the reach of established cross-national and subnational comparative methods. To realize the potential of transnational research requires support for transnational datasets, for elaboration of transnational methods, and for collaborative international research networks built around transnational approaches.

Speech Variation, Graded Competency, and Human Communication

White Paper ID 179

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Abstract: A major obstacle to language learning, language technologies, and the treatment of language disorders is accounting for language variation. Our research paradigm investigates the delicate boundary between permissible variation and speech that reveals idiosyncrasy or impoverished learning. At the heart of this white paper, however, is the scientifically validated finding that rich communication relies on the flexibility in speech production capacity. This proposition runs counter to normative and rigid notions of speech competence. We stress the urgency of recognizing that speech variation is the norm, not the outlier, in human communication. We argue that this has profound implications for speech teaching and learning. We highlight the importance of collecting multi-channel speech data that captures muscle activity, movement patterns, contact patterns, air flow, and multi-system coordination in order to build models that predict the range of speech that allows for effective communication. These models must explore speech variation and be able to predict the occurrence of extreme and rare events. Investing in empirically based speech research with a goal to model variation will strengthen the infrastructure of speech research (intellectual and technological capital) that will have profound impacts on health, society, and technological advancement.

An Expanded Social Scientific Perspective on Urbanism

White Paper ID 101

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Abstract: In order to address the complexity of world urbanization today, we advocate a new approach to research that we call the expanded social scientific perspective on urbanism. This approach is expanded in two ways: it transcends traditional disciplinary urban research; and it incorporates disciplines and approaches not normally part of the social sciences. We identify three main components: (1) the built environment and its interaction with people and society, incorporating the fields of environment-behavior studies, architecture, and planning; (2) an explicitly historical orientation, incorporating the fields of urban history and social science history; (3) comparative analysis at varying scales. Without this kind of broad, integrated trans- and multidisciplinary perspective, it will not be possible to adequately describe or explain the

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diversity of urban processes operating in the world and their consequences for society and the environment.

Contextualizing Social Science Data

White Paper ID 41

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Abstract: Research in the social, behavioral, and economic sciences can best be advanced by adopting rigorous, scientific methods to collect high-quality data. The value of reliable and valid data is optimized when it is both geographically and sociologically contextualized.

On the Role of Linguistics in the Future of SBE in NSF

White Paper ID 286

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Abstract: How do people effortlessly and efficiently understand what they read and hear, and how do they produce, at an amazing rate, complex speech streams understandable by others? How are these remarkable abilities acquired by learners, especially young children? Research on these questions has produced tremendous progress, but the more we learn about the complexity of language, the further we seem to be from understanding how ordinary people can have such a remarkable command of it, well beyond that of our best computer systems. Progress in an information-based economy is severely constrained by our computers inability to automatically understand the immense quantities of information in the form of human language. Language is studied from many methodological perspectives. But there will always remain a central place for the discipline of linguistics, which makes crucial contributions that are entirely distinct from other disciplines, contributions deriving from a unique perspective emphasizing cross-linguistic variation and general principles of grammar. Steadily increasing support for the increasingly interdisciplinary range of work done by linguists will accelerate the current progress in understanding human language, with many consequent benefits for language technology and language instruction in the multilingual information age.

Understanding Global Change: How Best to Organize Information?

White Paper ID 276

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Abstract: Understanding the larger socioeconomic challenges facing our society requires a long-term global perspective, but in practice such perspectives are almost impossible to achieve because the necessary datasets are fragmentary or non-existent. All too often, historical research is based on a single country or a small group of advanced economies; or on just the last 30 or 40 years. We need to assemble not just historical statistics but closely integrated metadata, including locations and reporting unit boundaries, so that researchers can explore alternative approaches to achieving consistency over space and time without requiring an army of assistants for each new project. We explore a range of possible approaches, concluding that existing social science data repositories are insufficiently integrated; that we cannot leave it all to Wikipedia, although an open collaborative approach is essential; that

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geographical information science technologies are necessary; but they are not sufficient, and concepts from other areas of information science are also needed, notably including ontologies and linked data. A set of more specific research challenges are identified, including the need to link vector- and ontology-based data structures for social science history with raster and grid-based resources in environmental history.

Some Research Priorities in Environmental Economics

White Paper ID 24

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Abstract: As the United States and other economies have grown, the carrying-capacity of the planet -- in regard to both natural resources and environmental quality -- has become a greater concern. This is particularly true for common property and open access resources. While small communities frequently provide modes of oversight and methods for policing their citizens, the scale of society has grown, and commons problems have spread across communities and even across nations. No over-arching authority can offer complete control, and so commons problems have become more commonplace and more severe.

Compassion and the Prevention of Violence

White Paper ID 155

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Abstract: Worldwide, there is an epidemic of human violence. According to GlobalSecurity.org there are currently 37 violent conflicts going on in the world today. One way of combating violence is the installation of compassionate attitudes and behaviors in human beings. Research into the understanding and creation of compassion is developing in this country but the prevention of violence may well depend, in part, upon a further understanding of this important construct and of ways to foster its development across society.

The Role of Data and Analytical Methods in Public Discovery and Implementation

White Paper ID 203

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Abstract: Although there are a few notable exceptions, participant-level data sets on the various aspects of our society are scattered, isolated, and available only to a limited cohort of researchers and policymakers. Now, the technology and expertise is available to bring these vast stores of data together and examine them in new and exciting ways. The statistical methods used to analyze these data are constantly being refined and enhanced, and combining data across policy topics and academic disciplines will allow researchers to address questions, both new and old, that are important in guiding our society into the future.

Towards a Scientific Understanding of Teaching

White Paper ID 152

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Abstract: Teaching, a most remarkable human achievement, has been quite neglected by the cognitive sciences, even though it has significant potential to produce insights into human cognition and culture. Two questions are asked: Why do we teach in the first place, and what are its origins? Among the domains that can yield answers to these questions are the ontogenesis of human teaching, anthropology, phylogeny, nonhuman animal teaching, the

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brain sciences, artificial intelligence, archeology, linguistics, and philosophy. For humans, teaching with a theory of mind may be a natural cognitive ability. Its ontogenesis involves two developmental trajectories: (1) cognitive prerequisites that allow teaching to emerge and (2) actual teaching. Human teaching may be both species-typical (i.e., universal) and species-unique with a theory of mind. Recent research indicates that four taxa of nonhuman animals teach, when an evolutionary theory and animal behavior functional definition is used. In the social neurosciences, researchers study how brains pass on information to each other in social situations. Teaching situations can determine the nature of synchrony between the teacher's and the learner's brains. Questions that are asked for each domain can yield basic science progress. Suggestions are made concerning how to foster the scientific study of teaching.

Chinese Ways of Innovation and the Challenges of Understanding Research and Innovation in the 21st Century

White Paper ID 130

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Abstract: Transformative innovation is the driving force for changes in global political and economical orders. However, innovation processes are not well understood. China will likely emerge as a global technological superpower in the next 20 years. As a developing country with a large low- to middle-income population of consumers, world-class manufacturing capacities including flexible industrial organizations in certain regions, and a well-capitalized central state, the Chinese Ways of Innovation appear to be significantly different from those in its predecessors. We recommend the NSF/SBE to launch an interdisciplinary program with a focus on innovation in China. Analyzing the Chinese Ways of Innovation will not only add greater knowledge to academic understanding of innovation processes as well as national and regional innovation systems , but also can lead to great policy insights. To understand the Chinese Ways of Innovation, it is imperative to examine the roles of enterprises, science &technology (S&T) communities, and the State as well as the domestic and the global environments. To successfully implement this core mission, we propose that NSF-SBE gives priority consideration to projects on infrastructure, networking, and talent training programs on innovation in China, which will build the capability of analyzing innovation in China as it unfolds.

Latino Gang Migration

White Paper ID 147

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Abstract: Various regions of the U.S. have recently witnessed the emergence of Latino street gangs for the first time ever. This presents a unique opportunity to analyze these groups in their earliest stages of formation to advance a theoretical understanding of street gang proliferation. While clearly linked to the growth of new Latino communities in various non-traditional destinations, it is not known exactly how or why street gangs are now forming. Most research on gang emergence in new locations claims it is a homegrown problem, a function of poverty and deteriorating social conditions. An alternate view, common among law enforcement officials, suggests that gang members strategically migrate from other places in the U.S. or Latin America as a way to expand their criminal operations. This proposal calls for a fieldwork research program to help understand what is driving the formation of these groups.

Risk Governance in a Non-Linear World

White Paper ID 71

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Abstract: U. S. society and U. S. risk research have operated on the assumption that past experience is a good predictor of future risks. However, this assumption is being increasingly challenged by the nonlinear nature of risk-related phenomena, as evidenced by recent catastrophic disasters, climate-change-related phenomena, and the world financial crisis. Climate-change scientists have concluded that stationarity is dead, but the same can be said in other scientific domains, owing to the speed and complex causal linkages that characterize our non-linear world. New risks are unprecedented, increasingly complex, and global in scale. Some social scientists even argue that our ability to create new risks has now far outpaced our ability to manage them. The premise of this white paper is that risk governance in a non-linear world requires new paradigms for the conceptualization of risk and new scientific endeavors, including activities that significantly blur disciplinary boundaries. This is an urgent need, because lessons learned from past experience and research may prove wholly inadequate for the risk governance challenges of the future. Mapping the emerging risk landscape and creating new risk governance institutions require both closer collaboration among the social science disciplines and closer integration between the social science and STEM disciplines.

The Future of Governance and the Use of Advanced Information Technologies

White Paper ID 154

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Abstract: This paper explores how advanced information technologies could be used to improve governance in the future. In addition to providing an overview of the uses of information technologies for governance, the paper offers a three-part vision of information technology in which intelligent systems assist decision structuring, evaluation, and understanding; intelligent systems actively assist decision making; and intelligent systems assume formal decision making responsibilities. Basic, intermediate, and full-scale applications are explored for each part of the vision.

Understanding the Huge Variation in Performance between Plants and Firms in Narrowly Defined Industries

White Paper ID 26

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Abstract: This paper discusses some developments in economics that are grand challenges for the social sciences over the next 10-20 years. One recurrent theme is the importance of heterogeneity in performance between firms and how this links to management practices. One of the most profound facts uncovered about modern economies is the huge variation in performance between plants and firms in narrowly defined industries. For example, within a typical four digit sector in US manufacturing output per worker is four times as high for the plant at the 90th percentile as the plant at the 10th percentile. And for total factor productivity the difference is still about double. Even wider distributions are evident in other nations. The key challenge, then, is what is the cause of these between plant productivity differences?

Clinical Trials in Economics

White Paper ID 62

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Abstract: The gold standard for scientific research is reproducible controlled experiments. In the last two or three decades, economics has made much progress in implementing experiments in both the laboratory and in the field. I propose that the NSF should set up a program to fund field experiments/ clinical trials in a variety of areas in economics. These clinical trials should be designed to resolve fundamental debates in economics. Proposals for experimental designs should be submitted to a special program and be reviewed by referees and a panel of experts, as with current experiments. Unlike current proposals, we would expect some iteration with respect to the experimental design. When a consensus (or a significant majority) is reached about experimental design, funding would be offered to the researchers. It would be helpful to involve researchers from public health and other fields who are familiar with the problems involved with large clinical trials. A related proposal is to investigate the ways that real-time, private sector data can supplement federal statistics in order to better understand the state of the macroeconomy.

Girl Spotting: The Performance of Female Identity in the Virtual Gaming Community of World of Warcraft

White Paper ID 79

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Abstract: This research project will examine how gender is expressed and performed in the virtual gaming community of World of Warcraft. The premise for this research is working through the assumption that virtual communities might break down gender lines through allowing members to pick their gender or doing away with biological differences in gender altogether. This research hopes to discover whether or not this is actually the case and, furthermore, fill an important gap in existing sociological studies about virtual societies and games. An important aspect of this research is finding out how female players perform their gender, if at all, within these virtual societies. Many of the female avatar appearances in World of Warcraft adhere to attracting male players through highly sexualized armor choices. How does this affect the female players choices? Initial observations suggest that some female players choose deliberately less attractive female avatars or even male avatars to avoid objectification by their male counterparts. The current research is lacking in areas related to gender. Since the phenomenon of multi-faceted virtual interaction is relatively new, only very cursory studies have been done on the subject of female gamers. Even more limited are studies dealing with online interactive gaming.

The Future of Indigenous Sovereignty

White Paper ID 99

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Abstract: Sovereignty in the new millennium is characterized by the increasing convergence of politics, economics, and culture as a result of shifts in the global political economy and the dominant role that finance capital now plays in governance. In order to address this shifting reality, future studies of indigenous sovereignty must approach the issue from an interdisciplinary, comparative perspective that examines how finance has become the fundamental matrix for governance and socialization.

Widening the Net: Challenges for Gathering Linguistic Data in the Digital Age

White Paper ID 121

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Abstract: Reliable scientific data from the full diversity of the world's languages is required to validate current views of the human capacity for language. The current methodologies of linguistic investigation fieldwork, experimentation, the mining of large corpora have inherent limitations. We raise the challenge of how these methodologies can be transformed to overcome their limitations. Meeting this challenge will require new versions of these methodologies that are simpler, more portable, and less culturally entrenched than those currently in use. Such methodologies should generalize cleanly to diverse languages, communities, and settings and should generate types of data that can be compared across languages more efficiently than can be done now. We consider solutions that maximize the potential of the native speaker as scientific investigator. Micro-tasks embedded in games and deployed on widely accessible electronic mediums, such as mobile devices, illustrate a promising means for realizing this goal and a viable system for expanding the diversity of data in other behavioral sciences.

Home Ecology: The Science of Environmental Justice

White Paper ID 289

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Abstract: In the United States, where health disparities between socioeconomic groups are increasing and low-income communities of color experience a disproportionate share of environmental burdens, we as a society must contend with important questions of environmental justice. How can we create a world in which everyone and their grandkids -- and their grandkids, etc --gets to live, learn, work, play and worship in a healthy environment that enables them to reach their full human potential and self-expression? How can home environments be sites of generation of love, creativity and resilience? This is a tremendous challenge that tends to be under-investigated by the scientific community -- especially the social sciences -- at the household scale. This general challenge is strongly reflected in two more specific ones: childhood health disparities with complex etiologies including significant environmental health factors, and disparities in access to affordable, healthy, and green housing. Both of these problems have the potential to be addressed through transdsciplinary action research in home ecology.

Integral Learning for Environmental Justice and Sustainability

White Paper ID 275

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Abstract: A fundamental challenge of the social, behavioral, and economic sciences is to develop theories, research methods, and social technologies that unleash the creative potential of humanity to address our global environmental, social, and economic crises. We, as human beings, must learn to listen and relate more powerfully, creatively, and compassionately with each other and the ecosystems of which we are an integral part. In sum we must cultivate ecological citizenship, inside and outside the academy. The SBE sciences must help lead the way, but we must change the way we do business. For far too long, scientific, generalized knowledge and technical knowledge have come to dominate our modern society's way of understanding the world, to the exclusion of other ways of knowing and relating that are also absolutely vital to our survival as a global civilization. Recent research suggests the unique and critical value of the social sciences for a sustainable future and the imperative for social scientists to change the way we do business.

Building Cultural and Social Indicators of Regional Innovation Capacity

White Paper ID 120

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Abstract: The inexorable forces of globalization, demographic shifts, and rapid changes in technology have all contributed to a wrenching economic crisis across the entire country. How to regenerate the American economy to assure global competitiveness and good jobs has become the central challenge of the decade. While everyone from academics to journalists, economic developers, and civic leaders are attempting to understand this downturn, they continue to rely on models of growth, analytical tools, metrics, and traditional disciplinary frameworks more suited to an industrial age while growth today is driven by developments in knowledge and innovation. The research challenge the authors find most compelling is the need to enhance the existing academic knowledge of dynamic and innovative regional eco-systems with the insights of more diverse fields of scientific inquiry, such as industrial history, cultural geography, and sociology. To fully understand and better promote change within regions it is essential to understand that economic dynamics are embedded in systems of socio-cultural values and behavioral practices, which can be rigorously studied and understood.

SBE Grand Challenge: Understanding the Complexity and Variability of Spoken and Signed Languages

White Paper ID 306

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Abstract: How do humans (learn to) manage the complexity and variability of speech in everyday language, or equally, the complexity and variability of sign in signed languages? Complexity pervades all aspects of the spoken and signed forms used in the world's languages. Variability arises from the interplay of cognitive and physiological factors governing the production and perception of speech and sign, biological and cognitive factors governing human social behavior, and cultural factors governing linguistic communication. Complexity and variability demand an interdisciplinary approach to investigating spoken and signed utterances from a broad spectrum of individuals, communities, social functions and settings. We propose to advance the investigation of spoken and signed languages by (1) creating new interdisciplinary learning and training programs that bring talented students and scholars from all relevant disciplines together in sustained collaborative learning and research interactions; (2) creating new, large speech and sign databases that represent the full variety of styles, speakers/signers, dialects, and languages; (3) advancing capabilities for intelligent datacapture (e.g., multichannel high speed AV and sensor networks), signal processing, and machine learning. This proposal builds on the successful approach of laboratory phonology, using research methods and tools from across the social and behavioral sciences, computer science and engineering.

Linguistics in the Twenty-first Century

White Paper ID 158

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Abstract: For the past half century, mainstream linguistics has focused on developing categorical analyses, based on the assumption that language is a property of the mind of the individual language user. By recognizing the essentially interactive character of language and using quantitative tools to describe it, linguists are now beginning to develop explanations that offer insights into human nature and provide links to other social sciences.

Attention in the Digital Age

White Paper ID 290

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Abstract: We are all participants in the largest social experiment of the past 500 years. Today's children are digital natives, inhabiting a world awash with technology vastly different from the one we have known. There is nothing we need to understand more than what impact immersive social technologies will have on the future. Within this framework several directions will be important to study: first and most central is the management of attention (multitasking, simultaneous attention, and linguistic relativity); second are issues of social learning and connectedness (attachment, identity, mirror neuron system); and finally a sense of purpose (empathy, compassion (or play) and moral reasoning). Immersion in technology has already altered children's way of thinking, perceiving, and acting, and coming advances will only accelerate such changes. What is at stake is how we interact, how we think, and what we think about. At the foundation of this change will be attention. What is needed, therefore, is an examination of attention in the digital age, accounting for everything from its ethnographic experience to its neurological basis, and whatever lies between. Starting with the most basic element of cognition -- our attention -- how will the digital world change who we are?

Energy Informatics

White Paper ID 156

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Abstract: Our civilization is built upon energy and information systems. These two disciplines, however, are studied independently. Energy systems, in the form of fossil fuels, have changed the environment dramatically in the last three centuries. Information systems have profoundly altered human interaction and our cooperative structures in the last five decades. We are dependent upon energy to run our information systems, and we are dependent on information systems to manage our energy systems. Energy informatics is a proposed new discipline that jointly studies the two great shaping forces of modern society. It has the potential to provide significant solutions to global climate change and the creation of a sustainable society.

Grand Challenges for the Scientific Study of Aging

White Paper ID 236

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Abstract: The growth of the aging population and the potential for improvements in health of the older population pose challenges and opportunities. These include a better integration of behavioral and social sciences, more emphasis on life-course perspectives, and enhanced international comparisons.

Making Science Publicly Effective

White Paper ID 57

Abstract: It is well known that issues that the scientific community considers settled are often hotly debated by the general public. Conveying scientific findings more convincingly is a behavioral question of great urgency. Studies of the social diffusion of knowledge are reaching new levels of insight, but the implementation of those insights are generally lacking. The diffusion of

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knowledge itself has changed radically in the past decade, and the impact of such features as blogs, social networking and instant updating of information have yet to be understood. Coherent policy decisions may rest on the results of such behavioral research.

Beyond Essentialist Thinking

White Paper ID 64

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Abstract: The most revolutionary idea in the past 150 years may be Darwin's having taken individual variation as data, rather than having averaged over it (Darwin, 1859; Dennett, 1995). This idea has been slow to be incorporated into behavioral studies, where individual differences are still typically taken as uninteresting noise. The issue is important from two sides: the subject matter is made of variation, and our theories must move toward describing categories as comprised of those variations rather than imposing categories on them. A grand challenge, therefore, is to incorporate this important yet unaccustomed approach into research throughout the social, behavioral and economic sciences, both in the object of study and in the fundamentals of our scientific theories.

The Relevance of Evolutionary Science for Economic Theory and Policy

White Paper ID 177

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With 63 signatories

Abstract: NSF's Dear Colleague Letter reflects the widely perceived need to go beyond current economic theory in the formulation of public policy. At the same time, there is a profound lack of unity among the disciplines that comprise the behavioral, social, and economic sciences. This white paper emphasizes the relevance of evolutionary science as a way to integrate the SBE sciences, similar to the integration that is more advanced in the biological sciences. Modern evolutionary science is broadly construed to include cultural in addition to biological evolution and the study of neural and psychological mechanisms (proximate causation) in addition to the environmental factors that brought the mechanisms into existence and result in the expression of specific behaviors (ultimate causation). It provides an exceptionally useful set of theoretical and empirical tools for integrating the many disciplines in the biological and SBE sciences required to formulate economic theory and public policy for the 21st century. The task of integration is already in progress and can be applied to the formulation of public policy without a long academic time lag. We therefore call for integration across disciplines and evolutionary science as an integrative framework to be recognized as a funding priority by NSF.

Race in the 21st Century: Shifting Paradigms, Changing Conditions

White Paper ID 66

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Abstract: Important transformations are currently underway in both social scientific and "commonsense" understandings of race at both national and global scales. These raise important and intriguing challenges for the social sciences. Despite decades of generally agreed-upon advances in both social scientific knowledge and the public sphere, no consensus or stabilization of meaning has been generated regarding the sociopolitical significance of race. Race remains a contested concept, generating competing claims about its relevance to such matters as individual capacity, legal and political rights, group identity and membership, and perhaps most important, about the causes and consequences of racial inequality, racial disparities in political power, and access along racial lines to political, social, and even human rights. The uncertainty about what race means today poses significant challenges for both social theory and democratic politics. Intellectually and practically, new approaches are required to understand emerging racial conditions, both in the US and around the world. A comprehensive and innovative approach to these problems is outlined here, based on a MultiCampus Research Program currently underway in the University of California.

A Rationale for Funding Large Proof of Concept Proposals

White Paper ID 11

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Abstract: The NSF should leverage its excellent track record of sponsoring important, high-quality, high-value research by extending its SBE Directorate into a new realm, large proof –of-concept projects. Researchers sometimes develop ideas of tremendous potential value to society, but most such transformative ideas cannot be proven with models, statistics, or other scholarly tools. Rather, they must be implemented in the real world on a fairly substantial scale before their quality can be assessed by policy makers or businesses. Unfortunately, many "big think" ideas never get tested in the real world due to a large gap between public and private research funding. Businesses rarely fund research that entails large expenditures and high degrees of uncertainty about rates of return. Governments, by contrast, often fund research with little or no clear commercial application. To date, however, they have not typically funded the large scale trials of innovative new policies or markets, though their competency and the rationale for them doing so is quite well established. Finally, the cost of not funding such potentially important projects is becoming increasingly clear.

Sensitivity Analysis through mixed Gini and OLS regressions Paper submitted to the NSF

White Paper ID 307

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Abstract: About 30 years ago Edward Leamer criticized the credibility of empirical research in economics. Since then there were huge improvements in research design, data collection and econometric methodology. On the other hand, the huge increase in computing power has increased the number of instruments available for the use of the over-zealous researcher who wants to prove his point. I suggest developing the mixed Gini and Ordinary Least Squares regression. It enables unraveling, tracing, and testing the role of several whimsical assumptions imposed on the data in regression analysis. Among those assumptions are the linearity assumption, the use of monotonic increasing transformations, and the symmetry between distributions that is imposed by the Pearson correlation coefficient. My conjecture is that the new technique will reduce drastically the number of results that are claimed to be supported by empirical "proofs."

Spatial Dynamics and CyberGIS for NSF SBE 2020

White Paper ID 92

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Abstract: University Consortium for Geographic Information Science (UCGIS) advocates that spatial dynamics and cyberGIS be identified as two grand research challenges for SBE 2020. Spatial dynamics and cyberGIS ask fundamental questions about the complexity, dynamics, and synthesis of social, behavioral, and economic systems. Making connections across space and time enables knowledge building beyond disciplinary boundaries to understand how new findings in one discipline relate to another for a holistic understanding of human dimensions. Expanding upon the spatial emphasis in geographic

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information science research, spatial dynamics research investigates cognitive and methodological advances to conceptualize, represent, analyze, and model the integrative spatiotemporal characteristics and processes of global systems. CyberGIS research enables a synthesis framework leveraging GIS and cyberinfrastructure to build a collaborative cybercommons of distributed benchmark datasets, computational testbeds, and knowledge webs for social, behavioral, and economic sciences. The fact that social network media is expanding rapidly and being accessed by a broad spectrum of society, and new generations of digital natives are stepping up to take center stage, gives unprecedented opportunities to allow real-time or near-real time spatially referenced data for SBE research. Grand research challenges of spatial dynamics and cyberGIS, both individually and more effectively together, are essential to understand spatial connections of activities, events, and processes across scales and dimensions for a cyber SBE knowledge enterprise with capabilities for SBE forecasting and predictions, and even nowcasting enabled by sensor networks, cell phone signals, or twitters.

Expanding 21st-Century Science Learning to Encompass Civic Reasoning on Science Issues

White Paper ID 109

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Abstract: Twenty-first-century cyberinfrastructures for distributed learning, communication, and knowledge sharing are unprecedented in the opportunities they provide for global citizens to come together to try to solve the great global crises of our time. Science and scientific research plays a critical role, yet to solve these crises requires a range of skills and understandings that include, yet go beyond science. Without such skills and understandings, the cyber infrastructures have the potential to become powerful destructive rather than constructive tools. This white paper proposes an interdisciplinary way of conceptualizing this pantheon of skills and understandings, which we refer to broadly as civic reasoning. We overview and illustrate the characteristics of civic reasoning. Then, we propose lines of research for identifying models of how distributed communities leverage cyber infrastructures in the pursuit of discourse and problem-solving around the critical issues of our day. Finally we propose research that channels that understanding into looking critically at how educational programs may need to change to make this broad vision a reality.

The Critical Geography of American Democracy: Tectonics of the Economic, Social, and Political

White Paper ID 164

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Abstract: One really grand challenge question, raised at least implicitly in recent decades for the social, behavioral, and economic sciences by critical human geographers, is whether establishing a theoretical foundation for society-nature relations can and should become a central disciplinary preoccupation. Figures 1 and 2, introducing this white paper on the Schellingian transcendental geology of American democracy's Social Nature, covering from Colonial days to the present and predictively into the future as well, graphically illustrates this possibility. In this radical socialization of nature, physical archetypes of American democracy's critical-geographic tectonics, recapitulated in a one-world Schellingian naturephilosophy as subjective (1) momenta, (2) impressed forces, and (3) inertias, are inherently large-scale, collective circumvallations (defensive embankments, fortifications, bulwarks); whose critical-geographic tectonics of socionatural structures and forces thus physically recapitulated theoretically unifies society and nature. Taking American society as exemplar: (1) is the elite upper tier, (2) is the populist lower tier, and (3) is the bourgeois middle tier. These socionatural

structures and forces sociologically ground the critical geography of American democracy, via their critical-geographic tectonics over the long term from Colonial days to the present. Considered within the framework of capitalism's naturephilosophy qua transcendental geology, American democracy's critical geography exemplifies Schelling's nature as subject.

Game Change: The Challenge of Representative Survey Sampling Facing the Behavioral Social Sciences in the Decade to Come

White Paper ID 103

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Abstract: The methodology of survey research is at the foundation of basic research in the social, behavioral, and economic sciences. This paper assesses the changing state of survey research over the last decade. It presents evidence of a fundamental shift in the difficulty of obtaining representative samples, a problem that will intensify to the point of forcing a paradigm shift in the coming decade. It also calls into question some of theoretical tenets of the probability sample, noting that decreasing standards of quality have yet to bring increased error of population estimates.

From Barriers to Bridges: Turning Great Science into Effective Policy

White Paper ID 118

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Abstract: The United States excels at producing and publishing scientifically reputable results but lags substantially at translating them into outcomes that could improve the lots of all who are affected by the research. We do not spend our research dollars and time studying how to overcome the barriers to why great science does not become great public policy. The challenge is to study how to change this state of affairs, a question that will require some fundamental research into how scientific findings that have the potential to improve life on this planet can overcome the political, cultural, and other barriers that prevent what we know from being put to work to improve the state of the world. We provide five illustrative areas of scholarship in which building bridges to transcend barriers between hard sciences and social, economic, and behavioral sciences would result in useful policy and beneficial outcomes.

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