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## A Decadal Survey of the Social and Behavioral Sciences: A Research Agenda for Advancing Intelligence Analysis

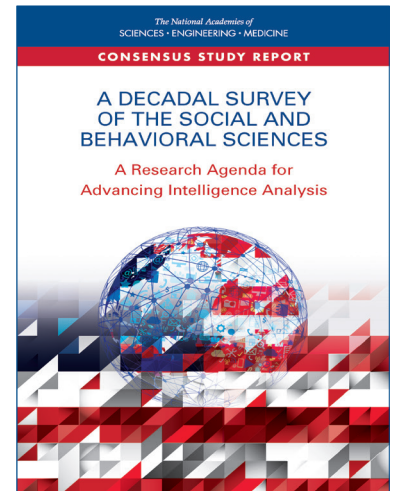
The primary function of the intelligence analyst is to make sense of information about the world, but the way analysts do that work will look profoundly different a decade from now. Technological changes will bring both new advances in conducting analysis and new risks related to technologically based activities and communications around the world. Because these changes are virtually inevitable, the Intelligence Community (IC) will need to make sustained collaboration with researchers in the social and behavioral sciences (SBS) a key priority if it is to adapt to them in the most productive ways, according to the report *A Decadal Survey of the Social and Behavioral Sciences* (2019) from the National Academies of Science, Engineering, and Medicine.

At the request of the Office of the Director of National Intelligence (ODNI), a committee of experts conducted a decadal survey—a review of research from SBS fields with the greatest potential to support the intelligence analysis process and enhance national security—to provide guidance for the development of a 10-year research agenda.<sup>1</sup> The report identifies key opportunities in SBS research for strengthening intelligence analysis and offers ideas for integrating the knowledge and perspectives of researchers from these fields into the planning and design of efforts to support intelligence analysis.

### KEY CONTRIBUTIONS OF SBS RESEARCH

SBS fields offer insights into human behavior, capacities, and limitations. The IC can benefit significantly from integrating those insights into both the content of intelligence analysis (understanding what people and adversaries do) and the technical means of analysis (improving and supplementing the analyst's human capacities). Targeted SBS research offers the potential for stronger intelligence assessments, tools and technologies designed for human use and human–machine interaction, and optimal readiness to confront evolving security threats.

<sup>1</sup>The National Academies of Sciences, Engineering, and Medicine developed the decadal survey model to serve other federal agencies—including the National Aeronautics and Space Administration, the National Science Foundation, the U.S. Department of Energy, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey—in surveying research relevant to key policy objectives. This is the first time the model has been used to survey SBS fields or to serve the IC.



## **STRONGER INTELLIGENCE ASSESSMENTS**

SBS research can support the development of intelligence assessments that are richer 10 years from now; it provides the essential theoretical and empirical bases for designing and using sophisticated tools and methodologies for analyzing new types of information and understanding complex social and political forces. Assessments may also be more nuanced because analysts will have tools that allow them to identify intersections and see connections in large-scale datasets that humans alone could not detect. Assessments may be more accurate and efficient because developing methodologies and tools will allow for faster processing of large volumes of data, integration of multiple kinds of data and other analyses, tracking of developments, and identification of urgent situations.

Developing research on narratives, social networks, complex systems, and affect and emotion can enhance understanding of the individuals and groups that are the primary targets of intelligence analysis, the potential impact of actions taken by the IC, and individual and social processes relevant to security threats. This research offers possibilities for new tools, including indicators for use in monitoring and detection of key security-related developments; algorithms for extracting meaning from large quantities of open-source information; and models for reasoning about the potential implications of various interventions or activities.

Realizing these benefits will require interdisciplinary, multimethod approaches to integrating insights from SBS fields with sophisticated technological developments.

## **TOOLS AND TECHNOLOGIES OPTIMALLY DESIGNED FOR HUMAN USE AND HUMAN–MACHINE INTERACTION**

Technologies that become operational in the coming decade and beyond, including advances in data processing and artificial intelligence (AI) that support large dataset analytics, dynamic search tools, statistical modeling, and interactivity, will augment the capacities of the human in vital ways, which will necessarily change the ways intelligence analysts use and interact with them. Insights from SBS fields are essential to the design and development of tools and technologies that

- take advantage of the strengths of both humans and machines,
- allow humans to collaborate productively with machine partners,
- support more accurate assessment and forecasting of human activity, and
- avoid serious unintended practical and ethical consequences.

SBS research will be needed for the design of tools that use AI and machine learning to support the development of an ecosystem for intelligence analysis composed of human analysts and autonomous AI agents, supported by other technologies, with the capacity to derive meaning efficiently from multiple sources of information. Technology used for analysis is only as strong as the understanding of the human behavior it is being used to model or explain. SBS research can also provide essential support for the procurement of products from the private sector, such as commercially available software programs and other technologies.

Realizing these benefits will require research to extend theory and findings from many disciplines—including the vision sciences, behavioral sciences, human factors, neuroscience, social network analysis, and the science of human teamwork—to improve understanding of

- how people extract meaning from large datasets;
- how information can be transmitted effectively, as well as filtered among distributed teams of humans and machines;
- new modes of forecasting that incorporate human judgment with automated analyses by AI agents;
- workload management in a complex environment of networked human and AI agents;
- communication protocols for coordinating the sharing of information among multiple human and AI agents in ways that accommodate the needs and capabilities of human analysts and minimize disadvantages associated with interruption and multitasking in humans.

## **OPTIMAL READINESS TO CONFRONT EVOLVING SECURITY THREATS**

The emergence of new threats in cyberspace is a profound challenge for the IC that will grow in scale and urgency in the coming decade. SBS research will be vital to the capacity to react effectively to future risks. Ongoing work is illuminating, for example, the nature of social networks and complex systems, protections against social cybersecurity threats, evolving ways adversaries influence hearts and minds, and the ways individuals are drawn into radicalization and extremism. The developing field of social cybersecurity can offer tools, tactics, procedures, and policies for assessing, predicting, and mitigating the impact of adversarial social cyberattacks.

Realizing the benefits of this work will require a comprehensive multidisciplinary research strategy for identifying, monitoring, and countering social cyberattacks. Research could support objectives such as the development of methods for

- assessing bias in online data, drawing conclusions based on incomplete data sources; and
- integrating data on such disparate phenomena as change in social networks and narratives; signals of influence and manipulation; and insights about social, cognitive, and emotional factors and other exploitable elements of social media communication.

SBS research can also aid in strengthening the overall effectiveness of the IC workforce, which is also key to readiness for the security challenges of the future. Translational research to identify the applications of a well-developed body of research and practice grounded in industrial-organizational psychology and related fields to the unique context of the IC can help IC entities strengthen their capacity to

- select individuals well suited to work as intelligence analysts;
- measure a broad range of attributes for use in selecting individuals and evaluate the predictive power and potential ethical implications of such assessment devices;
- support both organizationally directed training and autonomous learning;
- retain and engage effective employees; and
- provide support for a potentially stressed and fatigued workforce, drawing on emerging tools and methods for assessing and mitigating the effects of work in the high-stress environment of intelligence analysis, including cognitive fatigue, reduced attention, impaired performance, and decreased efficiency.

## **CAPITALIZING ON THESE OPPORTUNITIES**

SBS research offers a fundamental—indeed essential—contribution to the mission of the IC, a mission that requires understanding of what human beings do, how, and why. Technological and other developments in intelligence analysis that proceed without the benefit of SBS research are likely to be limited in their effectiveness or, worse, to result in misleading or distorted analysis. The committee recommends that the leadership of the IC make sustained collaboration with researchers in SBS a key priority as it develops research objectives for the coming decade. The committee highlighted the importance of

- interdisciplinary research,
- the integration of both foundational and emerging work in human behavior and processes and computational methods for large-scale data analysis with the expertise of the IC on analytic methods and challenges,
- the incorporation of deep understanding of the IC’s challenges with the identification of research plans,
- the integration of SBS insights into the design and engineering of technologically based analytic tools, and
- translational work to establish the direct utility of SBS research to the IC context.

Past collaborations between the SBS research community and the IC have yielded important scientific and analytic insights. Yet researchers and members of the IC have differing objectives, face differing challenges and constraints, and operate in contexts that have very different norms and expectations. To capitalize on the benefits of SBS research, the IC may need to alter procedures and ways of doing business that have been in place for a long time so it can develop a systematic approach to fostering SBS research and integrating the conduct of research and the application of its findings into intelligence analysis.

## **CAREFUL ATTENTION TO ETHICAL ISSUES**

Ethical issues may arise at all stages of the research process, and standards with respect to some issues—particularly those concerning the use of large-scale digital datasets—are developing and are also context-sensitive. For example, the development of a system of human-technology teams for use in intelligence analysis will raise important questions regarding access to data, authority, accountability, and protections when systems fail. Effective collaboration between the IC and the research community will require careful attention throughout the processes of research, design, and implementation of new tools and methods.

## **INGREDIENTS OF EFFECTIVE INTERCHANGE**

The IC is no stranger to the valuable contributions that SBS research makes to the work of intelligence analysis. And researchers from many SBS disciplines have benefited from opportunities to work with the IC and conduct research

on countless topics related to intelligence. The decadal survey was not only an opportunity to identify critical research opportunities for strengthening intelligence analysis but also a chance for the committee to consider challenges that have limited the IC's access to key SBS research and ways to foster interdisciplinary approaches in which the insights and ideas of SBS researchers are fully integrated with the needs and objectives of the IC.

Explicit attention to the respective intellectual goals, values, and perspectives of members of the IC and academic researchers is a prerequisite for productive collaboration, which is likely to involve four key ingredients

- building on effective examples of collaboration, such as communities of practice;
- strengthening cultural bridges between the two communities and addressing institutional obstacles to collaboration;
- providing opportunities for analytic staff to build their knowledge of SBS research and for researchers to improve their understanding of the IC; and
- relying on the principles of human–systems integration to facilitate the development of collaborative systems that function effectively.

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## COMMITTEE ON A DECADAL SURVEY OF THE SOCIAL AND BEHAVIORAL SCIENCES FOR APPLICATIONS TO NATIONAL SECURITY

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**For More Information . . .** This Consensus Study Report Highlights was prepared by the Board on Behavioral, Cognitive, and Sensory Sciences based on the Consensus Study Report *A Decadal Survey of the Social and Behavioral Sciences: A Research Agenda for Advancing Intelligence Analysis* (2019). The study was sponsored by the Office of the Director of National Intelligence. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project. Copies of the Consensus Study Report are available from the National Academies Press, (800) 624-6242; <http://www.nas.edu/SBSDecadalSurvey>.

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