

# A METHODOLOGY FOR IDENTIFYING LESSONS LEARNED

AN INTEGRATION OF  
CASE STUDY TECHNIQUES WITH GENERAL  
SYSTEMS PARADIGM & CONGRUENCE THEORY



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# A METHODOLOGY FOR IDENTIFYING LESSONS LEARNED

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CASE STUDY TECHNIQUES WITH GENERAL  
SYSTEMS PARADIGM & CONGRUENCE THEORY<sup>1</sup>

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CENTER FOR THE STUDY OF  
NATIONAL RECONNAISSANCE

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"In every field of inquiry, an adequate paradigm reveals patterns of coherent relations in what are otherwise inexplicable random coincidences"

Richard Tarnas  
*Cosmos and Psyche: Intimations  
of a New World View*, 2006

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## Foreword

Learning is critical to individual development and survival. As children and adults we all have had to learn immense amounts of information and skills to function and survive in the world. Organizations, as with individuals, also need to learn if they are to operate effectively and sustain superior performance and avoid failures.

When organizations overlook or neglect to learn lessons, they fail. Blockbuster, founded in 1985, dominated home movie rentals in the late 1980s by distributing VHS video recordings to customers who visited their extensive network of stores. While Blockbuster was operating under that model, a new technology, digital video discs (DVDs) appeared, and a new competitor, Netflix, initiated a novel “rentals-by-mail” DVD marketing strategy, which proved to be very successful. Blockbuster then turned to a “rentals-by-mail” strategy, and at the same time tried to create and to hold onto a mixed model with its stores, but Netflix had moved ahead to digital delivery of streaming videos over the Internet. Twice Netflix leapfrogged Blockbuster, a company, apparently, that had not learned lessons about marketing and innovation. Blockbuster filed for bankruptcy in 2010.<sup>1</sup> In another case, the iconic company, Kodak, which had a name that was synonymous with film and photography during most of the 20<sup>th</sup> century, did not seem to see a lesson when photographers turned to digital imagery; the company filed for bankruptcy in 2012<sup>2</sup> (Blockbuster, n.d.; Kodak, n.d.; Newman, R., 2010; Sinek, S., 2010; History, 2013).

This monograph describes a social science methodology that an organization’s leadership can use to identify and learn lessons to maintain and improve the organization’s performance—to identify those behaviors that either should be encouraged or corrected. By using this kind of social science methodology, the organization’s leadership can apply the research-based lessons to the organization’s processes so as to ensure continued successes and the avoidance of failures.

To some, the findings from this kind of social science research may appear to be merely formulating “statements of the obvious” or reporting “knowledge of the obvious.” This kind of reaction is not unexpected, as it seems to be a ubiquitous criticism of social science research where laypersons typically describe social science findings as nothing more than the obvious—a psychological phenomenon best described as hindsight bias (i.e., the “I knew it all along” effect). However, the reality is that these kinds of findings typically are not obvious prior to completing the research. It only is after observers learn of the research findings that they come to label the findings as self-evident facts. They do not accurately anticipate the correct findings prior to the research. The popular wisdom that generally is accepted as fact, most often turns out to be contrary to actual social science research findings (Gage, 1991; Kelley, 1992; Myers, 1994; Stanovich, 2009; Lilienfeld, 2012).<sup>3</sup>

But it is assessing—with a social science methodology—the experiences in our most recent and more distant histories where, through the structured social science research, we can identify

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<sup>1</sup> In September 2010, Blockbuster, Inc. filed a voluntary petition under Chapter 11 of Title 11 of the United States Code in the United States Bankruptcy Court for the Southern District of New York (Blockbuster, n. d.).

<sup>2</sup> On January 19, 2012, Eastman Kodak Company and its U.S. subsidiaries filed voluntary petitions for Chapter 11 business reorganization in the U.S. Bankruptcy Court for the Southern District of New York (Kodak, n.d.).

<sup>3</sup> Social science research has produced evidence that “popular wisdom” and “folk knowledge” such as the follow examples are inconsistent with research findings: opposites attract; familiarity breeds contempt; expressing pent-up anger reduces anger; on multiple-choice tests, the test taker should stick with the original answer (Lilienfeld, 2012, p. 114).

useful lessons, not only for our present, but also for our future. The most recent histories may be only days or hours ago; the more distant histories may be years or even decades ago. As you look back to make your assessments and learn lessons from your organization's histories, I urge you to do this with a structured, social-science-based methodology, such as I have offered in this monograph. I believe that only in this way will you be able to find valid lessons, not folklore and legends. The successful assessment of any historical experience can only be discovered within a larger hermeneutic context—a context for the study and interpretation of human behavior and social institutions such as encapsulated by the general systems paradigm and congruence theory (Heywood & Stronach, 2005).

“A historical analysis always has to be performed with its own hermeneutics from the period, not to justify the events, but rather to understand them. It is essential to analyze history in the cultural context of the moment in which the events occurred....Another important issue is to analyze historical processes in their entirety and not remain with a fragmented interpretation because that fragment then becomes universalized and takes the place of the entirety, and it becomes a legend” (Bergoglio & Skorka, 2013).

I suggest that the methodology I have outlined in this monograph will aide you in conducting an analysis of your experiences within the full context—historical, cultural, and operational—within which your organization resides. And out of that assessment you will identify lessons that are based on solid research and will prove useful for the success of your organization.

ROBERT A. MCDONALD, PH.D.

Director, Center for the Study of National Reconnaissance

# Preface to An Integration of Case Study Techniques with General Systems Paradigm & Congruence Theory<sup>4</sup>

When I had the privilege to serve as a Professor of National Security Policy and Psychology at the National War College, I found that both I and the students learned some of the most meaningful lessons through our analyses of case histories that had documented the experiences of national security leaders in dealing with complex problems. During seminar we would review the case descriptions, formulate hypotheses that could explain what happened, hypothesize alternative courses of action, and challenge those hypotheses with our developing insights.

I believe both the analytical experiences and the lessons that the students learned from their case analyses proved useful to them in their future assignments as flag officers in the military and senior executives in the national security community.

One of the greatest national security challenges during the early years of the 21<sup>st</sup> century was the terrorist attacks of 11 September 2001. After that event the various intelligence oversight bodies highlighted the importance of the Intelligence Community (IC) identifying lessons from retrospective analyses of past experiences. When the Weapons of Mass Destruction (WMD) Commission highlighted the importance of the IC learning lessons, it brought to mind the War College students' search for lessons in their case studies. I wondered what was the methodology behind those successful learning experiences, and how might they be applied to the broader challenge of the WMD Commission for IC organizations to learn lessons?

Several years after completing my assignment at the War College, I had the opportunity to be a student in a senior executive course at the Wharton School and was reintroduced to the application of systems theory to the study of organizations. It was reminiscent of my earlier exposure to general systems theory and congruence theory during my years as a doctoral student. After the Wharton course, I concluded that these concepts could be useful in identifying lessons for any organization, whether it be in the private sector or the government. The challenge was to integrate these various social science approaches for analyzing organizational behavior into a structured methodology that could offer insight into identifying lessons that could aid the organization in sustaining and improving the quality and output of its mission operations.

It is difficult to find reflective time to integrate these kinds of concepts and to formulate a methodology that could be applied to social science research. However, I did find that opportunity during my periodic visits to Maryland's Eastern Shore on the Delmarva Peninsula. I used that opportunity to take on the challenge to reflect on how case studies, systems theory, and congruence theory could be integrated into a structured methodology to identify lessons, with specific attention to IC organizations. There could be many ways to do this. I offer you the approach in this monograph.

ROBERT A. MCDONALD  
The Eastern Shore

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# Introduction

*On Sunday morning, **December 7, 1941** . . . over 300 Japanese planes . . . **attacked** . . . **Pearl Harbor** in the Territory of Hawaii. . . . We come today, over 4 years after the event, . . . to record for posterity the facts of the disaster. In another sense we seek **to find lessons** to avoid pitfalls in the future to evolve constructive suggestions for the protection of our national security.*

(U.S. Congress, 1946)

***September 11, 2001**, was a day of unprecedented shock and suffering in the history of the United States. . . . The law directed us to investigate “facts and circumstances relating to the **terrorist attacks**” . . . Our aim has not been to assign individual blame. Our aim has been to provide the fullest possible account of the events surrounding 9/11 and to identify **lessons learned**.*

(Commission on Terrorist Attacks, 2004)

The Japanese militarists surprised Americans on December 7, 1941 by attacking Pearl Harbor. Sixty years later the Al-Qa’ida terrorists surprised Americans on September 11, 2001 by attacking New York and Washington. Subsequent to the 1941 and 2001 attacks, U.S. officials conducted inquiries to discover facts about the attacks and to identify lessons to be learned, especially with regard to intelligence activities. After 11 September 2001 there was increased pressure on the Intelligence Community (IC) to study its past experiences in order to learn lessons for the future. The Weapons of Mass Destruction (WMD) Commission (2005) cited, as one of its most important recommendations, that the Director of National Intelligence (DNI) “create mechanisms to ensure that the Intelligence Community conduct ‘lessons learned’ that will better equip it...to identify its own strengths and weaknesses.” In this monograph I have suggested a research approach to help achieve that goal—a systems-oriented research methodology for identifying lessons learned.<sup>1</sup>

I developed this methodology out of the case study framework that long has been part of social science research. To guide data collection I turned to the paradigm of general systems theory. To guide analysis of the data I turned to congruence theory. The case study framework, along with these two ways of thinking—systems theory and congruence theory—can be integrated into a disciplined social-science-based research methodology. I believe such a methodology is ideal for analyzing the activities of an organization with the goal of identifying lessons to be learned and applied to future actions, and I believe the methodology is applicable to the analysis of any organization, whether it be a national security organization, such as an Intelligence Community agency or a military command, or any other organization, such as a law enforcement agency, an educational institution, a financial institution, or a business operation.

This disciplined research methodology is an organizationally focused diagnostic activity that examines organizational transactions within a near-current historical context. The focus is to gain insight into how to influence positive future organizational behavior. The objective is not to

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<sup>1</sup> There are other more traditional ways to search for lessons, and these may very well prove helpful. However, I will not describe them in this monograph.

document a historical record of organizational behavior, not to write an interesting anecdote about organizational experiences, not to develop recommendations for future organizational behavior, and not to seek how to conduct a past practice better if there were a second opportunity. Rather, its objective is to analyze a recent past and to gain fundamental insight from that past experience—insight that will serve as a basis for members of the organization to make informed decisions about future individual and organizational behavior.

In doing this, the researcher must address those experiences that are both “satisfying” as well as “frustrating.”<sup>2</sup> The challenge in identifying lessons is to uncover in past experiences the insights that can be generalized as constructive principles that suggest options to form productive future behaviors. The goal is to gain insight from the past experiences in order to be able to shape future behavior in a positive way. The universe of historical experiences is broad and includes experiences that fulfill organizational objectives, as well as experiences that leave gaps in meeting objectives. In this methodology, we are interested in studying that full range.

I believe that many of the traditional methods that government agencies, such as in the national security and law enforcement communities, have used to identify lessons may be incomplete or flawed for long-term insight. They typically identify findings that are useful for specific situations, but they fail to offer fundamental insight that is applicable to a broad range of situations. In many cases the traditional methods also lack the rigor of an objective, disciplined approach that is founded in the social sciences and necessary for broad generalization. The law enforcement and national security communities do not have the luxury to rely solely on tradition, ad hoc methods to identify lessons that have narrow applications. The complexity of 21st century threats, and the speed with which those threats can metastasize, argue for more integrated and social-science-based research to identify lessons.

#### Roadmap for this Monograph

The first three sections that follow this introductory section (i. e., the sections on case study, general systems paradigm, and congruence theory) will introduce you to the case-study-based framework and explain how it can integrate the general systems paradigm and congruence theory into a methodology for the collection and analysis of data in support of lessons-lessons research.

- The case study serves as a framework for the qualitative documentation and assessment of the facts surrounding a particular experience or event.
- The general systems paradigm enables the researcher to view the organization and its processes as a complex set of integrated and interacting components and ensures that the researcher collects data on all the components that affect the functioning of the organization.
- Congruence theory provides the researcher with a framework to analyze the data by assessing how effectively the various components of the system fit together, which ultimately affects the performance and life of the organization.

The final three sections (i. e., the sections on integrating the methodology's components, identifying flaws, and offering concluding comments) outline the phases in this integrated research methodology, point out some potential flaws in collecting data and conducting analyses, and offer brief insight into applying the lessons. In this way the methodology should help identify ways that could enable an organization to sustain those satisfying experiences that bring about positive results and avoid those frustrating experiences that block attaining the organization's objectives and goals.

The five appendices at the end of the monograph suggest a number of tools that could be useful in conducting the research.

<sup>2</sup> I selected the terminology, “frustrating experiences,” and “satisfying experiences” to avoid the use of the terms, “failure” and “success.” Using the term “failure” encourages risk-averse behavior within the organization; it invites blame-assigning behavior from outside the organization. There are no failures—only insights that offer opportunities to learn. When an individual or organization falls short of its goal, it is the frustration from that experience that generates the psychic energy to learn. There never can be total success—only imperfect human behavior that provides opportunities to move toward total success. When there is a degree of success, it is the positive reinforcement from that satisfying experience that generates the psychic energy to move forward and learn more.

## Case Study Framework for Lessons Learned

*Il était une fois . . .*

“Once upon a time there lived in a certain village a little country girl, the prettiest creature who was ever seen . . .”

—From *Little Red Riding Hood* by Charles Perrault

*Vieną kartą . . .*

“Once upon a time there lived an old man and an old woman. Every morning they went out to clear a nearby . . .”

—From *The Swan Queen* Lithuanian folk tale

*Fadó, fadó, fadó a bhí ann. . .*

“A very long time ago, there suddenly appeared in old Ireland two unknown merchants of whom nobody had ever heard . . .”

—From *The Countess Kathleen* O’Shea, Irish folklore

*C’era una volta . . .*

“Once there was a very rich man who had a son who could not tell a bean-pod from a cucumber . . .”

—From *Good Helpmates*, Italian folk tale

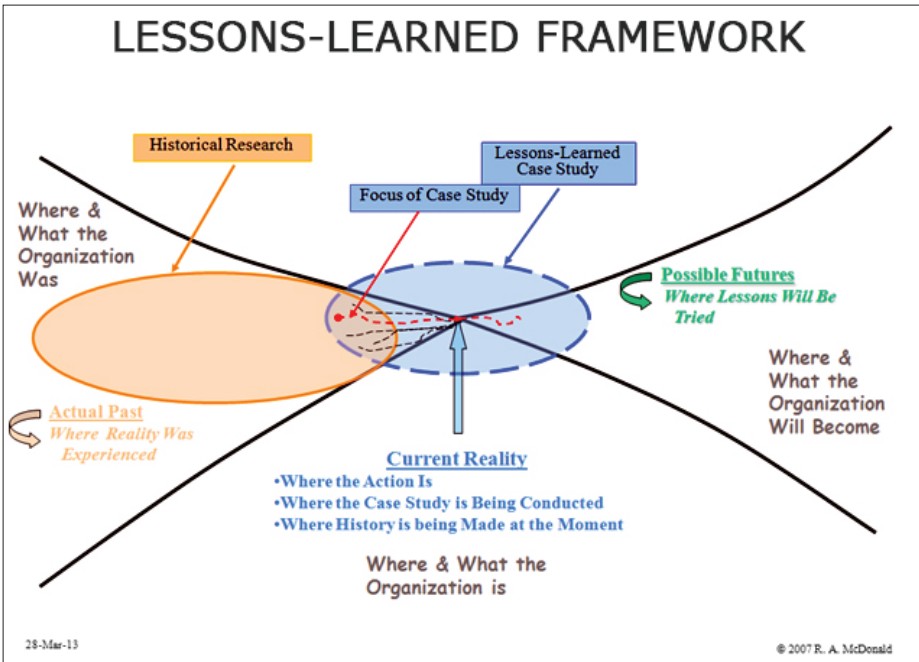
“Once upon a time” is the traditional way to begin a story in many cultures and languages. And that is what a case study is—a story about an experience. And like the stories about folktales, which often have a moral or lessons, the story in a case study provides a basis for identifying a principle that can become a lesson.

The social science community generally accepts the case study as “the bedrock of scientific investigation.” Bromely (1986) reported its use “. . . in areas disparate as: administration, anatomy, anthropology, artificial intelligence, biochemistry, business studies, clinical medicine, counseling, criminology, education, gerontology, history, industrial relations, jurisprudence, management, military studies, personality, politics, psychiatry, social work, and sociology” (Bromely, 1986, p. ix).

The term “case-study” has a different meaning for each of these disciplines: For example, in psychology it might relate to the study of a segment of a life-story where the psychologist is seeking to understand the personality of an individual; in social work it might mean the

study of relationships where the social worker is seeking to understand a family in distress; for business it might refer to the study of organizational performance where a consultant might be seeking to explain the success or failure in the output of the organization (Bromely, 1986).

For our approach in lessons-learned research, the case study methodology is the detailed and disciplined examination of past behaviors, performance, or events with the purpose of developing explanations or hypotheses that might be generalizable to other experiences, either in the past or in the future. The case-study methodology is disciplined in the sense that it is scientifically based research. In this way it can offer scientifically founded, broad-based explanations about why organizations perform as they do. It can provide a systematic body of knowledge that leadership can draw on as a means to improve marginal organizational performance and to sustain high organizational performance (Bromely, 1986; George & Bennett, 2005).



**Figure 1: Lessons-Learned Framework** (Adapted from Bromely, 1986, p. 80)

### Case Study Compared With Case History

The case study, as I will describe it, is different from the case history. The case study for lessons-learned analysis focuses on a *particular issue* or *set of issues* over the period of time that is relevant to the issue or issues of interest. It documents the individual's or organization's behavior relevant to those issues under study. It is not a comprehensive history of the issue and its origin. The case history, by contrast, typically is an extended narrative account of the formative and cumulative events that define a set of events and associated behaviors in the past. While the case history focuses on the past, the case study is not limited to a particular historical

context; it actually considers all three aspects of time—the past, the present, and the future: the past for insight; the present for reality; and the future for expectations (Bromely, 1986, p. 79).

The case study methodology collects data about historical performance, which is in its recent history, but it analyzes the data within a current context to anchor it in reality. Figure 1 illustrates how this case-study methodology is centered on present realities, yet draws on historical experiences while looking toward possible futures. The focus of lessons-learned research is within the current reality as depicted by the oval in the center of the figure. The central oval overlaps into a near point within the left oval that represents the historical experience of the organizations. The event of the case study is depicted by the indicated dot, which is in the more recent history that overlaps current reality. The results of the lessons-learned analysis look toward the right into the future where the lessons can be experimented with as the organization evolves into what it will become. This conceptual model can help the researcher focus on bringing the past into the present; and project an analysis of that current reality into what might be by focusing on possible futures (Bromely, 1986, p. 80).

## Alternative Case Study Models

There are a variety of endeavors that analysts might consider case studies, but many of those endeavors typically do not meet the standards of a disciplined, scientific-based case study. The description of an anecdotal experience that illustrates a particular point is not this kind of case study; a hypothetical story that is part of a narrative is not this kind of case study; an account that documents an ad hoc inquiry is not this kind of case study. These are sagas, fictional accounts, and reports, not examples of disciplined case studies based on social science methodology. The methodology that I refer to for a case study must comply with the disciplined approach of scientific inquiry. It must independently specify a research question, systematically collect and record data, logically analyze the data, and objectively form conclusions (Bromely, 1986, p.268).

## Applicability of Case Study Methodology to Lessons-Learned Analysis

This case-study methodology is ideal for observing and studying the nature and performance of organizations, especially those involved in high-tempo/high-risk operations, such as national security, law enforcement, and medical functions. In much of the remainder of this monograph, I will use the Intelligence Community, as one kind of national security organization, that can serve as an example of an organization with high-tempo/high-risk functions that can most benefit from this kind of analysis. The methodology is flexible enough to document and organize what might be important in a wide-range of particular issues under study. It is structured enough to offer insight into the fundamental nature of the organization and its members, and it is objective enough to suggest lessons that can be applied universally across organizations for future insight. Out of the analysis, the case study can offer ways to understand the dynamics of the case experience and identify lessons for the future, both lessons

for continued positive organizational performance and lessons for modified corrective action. The case study is particularly helpful because it can provide useful information about the experience and provide a model or example based on the lessons from the experience (Bromely, 1986, pp. ix-xi, 72-73, 268).

The case study begins with a concise research question that gives rise to the inquiry. The research question can be open ended and ask about an event or series of events (e.g., why did intelligence fail to warn of the Japanese attack at Pearl Harbor at the start of World War II?), or it can offer a hypothesis about a particular phenomenon (e.g., it was the strength of teamwork between the CIA and Air Force that resulted in the quick development and fielding of first the U-2 reconnaissance aircraft and later the Corona imaging reconnaissance satellite during the early days of the Cold War) (Bromely, 1986, p. 72).

After the investigator defines the research question, there are two fundamental steps that are essential to case-study research: (1) data collection and (2) data analysis. As I indicated earlier, for our adaptation of case-study methodology to lessons-learned research, I used the general systems paradigm as the framework for data collection and congruence theory for data analysis. In the next section I will discuss the application of the general systems paradigm to data collection.

## The General Systems Paradigm—A Model for Lessons-Learned Data Collection

*“Beyond Ghor there was a city . . . The populace became anxious to see the elephant, and some sightless from among this blind community ran . . . to find it. . . [T]hey groped sightlessly, gathering information by touching some part of it. . . . The man whose hand had reached an ear . . . said: ‘It is a large, rough thing, wide and broad, like a rug.’ . . . [T]he one who had felt the trunk said: ‘. . . It is like a straight and hollow pipe, awful and destructive.’ The one who had felt its feet and legs said: ‘It is mighty and firm, like a pillar.’ Each had felt one part out of many. Each had perceived it wrongly. . . . All imagined something, something incorrect.”*

—From “*The Blind Ones and the Matter of the Elephant*”

The classic Sufi story about the blind villagers and their study of the elephant is an example of why general systems theory is an appropriate model for collecting lessons-learned data.<sup>3</sup>

In this story the blind villagers examined the elephant, not as a complete, integrated, living system, but as individual parts of an entity. Because of this incomplete—and what turned out to be a failed—approach to data collection, the villagers’ subsequent analyses were flawed. Not one of them correctly could identify the entity as a complex living organism or elephant, nor were they in a position to make meaningful behavioral inferences about this as an entity. If they had used a systems theory approach to conceptualize the entity as a system that was a living organism with integrated subsystems, they could have avoided that fundamental error.

General systems theory is particularly valuable in studying social organizations because it offers a framework that is ideal for treating large complex organizations and uses a common vocabulary that can unify several social science disciplines associated with the study of both individual and organizational behaviors. It allows the researcher to understand the whole system rather than being limited to explaining the interaction of one or two of the system’s aspects (Buckley, 1967, p. 39; Levinson, Molinari, & Spohn, 1972, p. 27).

General systems theory is a comprehensive approach for describing and gaining an understanding of the full range of phenomena associated with a particular entity. Van DeVen and Ferry (1980, p. 1) reported that there is general agreement among management theorists and practitioners that the design of organizations—i.e., the environments and structures with which they operate and the interactions within and outside those structures—make a difference in the organization’s performance. Those interactions determine the organization’s outcomes and are essential for the researcher to understand if the researcher is to be able to identify lessons that will effectively and strategically improve the organization’s performance (Katz & Kahn, 1966, p. 28, 453).

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<sup>3</sup> A “Sufi” is a Muslim mystic whose teachings, Sufism, address the inner, mystical, psycho-spiritual dimension of Islam (Godlas, 2008).



It provides the researcher with both a conceptual language and a structural framework to observe the system's performance and collect data about it. With this systems framework, the researcher can come to understand the interactive nature of the whole system rather than merely understanding something about a few aspects of the system. Only if researchers apply this kind of systems framework, which considers all parts of the organization, will they be able to see and understand an organization as it truly is and make meaningful inferences about the organization's future behavior (Katz & Kahn, 1966; Levinson, et al., 1972; Sutherland 1973).

The systems approach, when it is applied to any field—biology, physics, or organizational assessments—facilitates several aspects of data collection and analysis: (a) identifying the interactive components of the organization; (b) finding relationships in the organizational system; (c) uncovering patterns of interaction for the organization; and (d) mapping the cycles of input, transformation, and output of the organization. By collecting organizational data in this way, general systems theory provides a holistic and integrated orientation for the collection and analysis of complex organizational data, such as what occurs in national security, law enforcement, and medical organizations. It is ideal for collecting data about, and assessing the performance of these kinds of and other high-performance/high-tempo organizations (Buckley, 1967, p. 39).

## Flaws in Traditional Approaches to Collect Organizational Data

Traditional approaches for the study of organizations and their performance tend to be either narrowly narrative or mostly metric in their focus. Typically they study only a part of the organization or its processes; they either collect descriptive data about a component of the organization, or they focus on measuring selected aspects of the organization's performance.

**Traditional Descriptive Approach.** The collection of descriptive data focuses on examining components of the organization, discussing their tasks, and characterizing their bureaucratic structure. This kind of approach typically answers questions about the structure of the organizations (i.e., "What are the roles required to do the organizational tasks?"), questions about the nature of the task (i.e., "What are the components of the task?"), questions about the bureaucratic structure (i.e., "What are the organizational units involved in doing the task?"), or questions about the informal organization (i.e., "Who talks with whom under what circumstances?"). These kinds of questions lead to descriptive answers, which may be useful for some inquiries, but they are flawed for uncovering lessons that can be used to improve future organizational behavior. The descriptive approach does not offer information about relationships that are essential to gain insight for improving organizational behavior (Levinson, et al., 1972, p. 5).

The descriptive approach is imperfect because it tends to focus on describing individual components or aspects of the organization or the processes that its components perform—but all as separate entities. One example would be examining an organization's morale, another might be studying its financial health, and another might be looking at relationships with external organizations. In none of these examples does the approach offer a comprehensive methodology that studies the entire organization and its interactive processes. One of the

fundamental flaws of this single-focus descriptive approach is that the analysis might suggest a lesson to resolve a problem in one part of the system, but that remedy in one area might create new problems for the organization in other parts of its system (Levinson, et al., 1972, p. 5).

**The Traditional Metric Approach.** The collection of metric data typically focuses on measuring indicators of organizational performance such as cost, schedule, quantity, and quality. These kinds of data may have their useful application, but they do not lend themselves to identifying lessons that could offer insight into sustaining superior performance or improving marginal performance. Van De Ben and Ferry (1980, p. 3) argued that these metrics do not explain why or how the organization achieved or failed to achieve a given level of performance. They merely measure output and are unable to provide information about the organization's environmental conditions, which are essential to gaining insight about the organization's interaction with that part of the overall system. As a result, the organization's management will not have the insight into factors that might positively influence the organization's long-term performance. One of the fundamental flaws of this metric approach is that the performance indicators do not offer insight that could yield broad lessons to positively influence long-term organizational behavior (Levinson, et al., 1972, p. 5; Van De Ven & Ferry, pp. 2-3).

## The Advantage of Using the General Systems Paradigm Approach

These traditional descriptive and metric approaches may be useful for some inquiries, but they do not lend themselves to identifying lessons needed to sustain superior organizational performance and improve organizational performance. They tend to overlook system interactions and, as a result, have a high probability of identifying lessons that might suggest strategies to improve a part of the organizational system. Without considering the interaction of all parts of the system, these strategies could create new problems in other parts of the organizational system (Levinson, et al., 1972, p. 5).

Scientific progress generally is achieved through the use of a framework where the constructed model serves as an effective allegory of the real-world phenomena under investigation—a framework that approximates what it is that researchers are trying to describe, reconstruct, predict, or explain. General systems theory provides that kind of model for studying lessons-learned in organizations such as those in the national security, law enforcement, and medical communities. It is ideal for collecting data about, and assessing the performance of these kinds of and other high-performance organizations (Buckley, 1967, p. 39).

The general systems model offers a conceptual language and lexicon of terms that are applicable to systems of all types. More specifically, it offers an epistemology that can be relevant to the study of high-performance/high-tempo organizational behavior and performance. It offers a technique for treating large, complex organizations and a common vocabulary that can unify several disciplines associated with the study of organizational behavior (Buckley, 1967, p. 39; Sutherland, 1973, p. 19).

Sutherland (1973, pp 139-140) suggested the systems theory framework offers the researcher an information-gathering medium. As such, it can be a systematic way to collect data about the organization and its performance, and organize the data for analysis.

## Conceptualizing the Collection of Systems Data

Lessons-learned researchers face the same challenge as the villagers who studied the elephant and collected data in the Sufi story. Using the Intelligence Community as a typical high-performance/high-tempo organizational component within the larger national security organization, we can see that similarity. When analysts study Intelligence Community components they, like the villagers, typically fail to view the target of their study as an integrated system. In both cases the general systems model would provide a more holistic and integrated orientation to the study and collection of data for what, in both cases, are complex systems (Buckley, 1967, p 39).

The IC and its organizational components are, by definition, systems and share properties of other open-ended systems. They are composed of sets "... of elements standing in interrelation among themselves and with the environment" (von Bertalanffy, 1968). More specifically, they are open systems that, unlike closed systems, maintain themselves in a state of continuous inflow and outflow of "energy" with their environments. During this inflow, which is in the form of resources and information, they break down and build up that energy into various components, which in turn the system transforms into an outflow of energy that can be in the form of action or product (von Bertalanffy, 1968).

For the Intelligence Community, agencies initially import energy such as funding, personnel resources, and information; then they conduct a transformation process such as analyzing intelligence, conducting research and development, or acquiring intelligence systems; and finally they export some kind of output product, such as intelligence reports, new ideas, or intelligence collection systems. The IC organizations are evolving systems and operate within the boundaries of a specific environment that limits their selection and reception of the inputs, and constrains the volume and content of the output (Katz & Kahn, 1966, pp. 28, 453).

Intelligence Community organizations, as social systems, lack the tangible structures of their counterparts in physical and biological systems. Rather, their structures are composed of events and practices, and therefore the structure is inseparable from the organization's functioning processes. This is why any study of the events and practices of an IC organization requires a systems analysis (Katz & Kahn, 1996, p. 69).

Each agency is a subsystem of the larger IC. For example, on one level, the National Reconnaissance Office (NRO) and Central Intelligence Agency (CIA), are 2 of 17 generally

recognized agencies that are part of the larger Intelligence Community.<sup>4</sup> On another level, the NRO, CIA, and other IC agencies are composed of subsystems, themselves—directorates, offices, and field elements. Those components are composed of other subsystems—program offices and other sub elements (Levinson, et al., 1972, p. 4).

At the same time, the Intelligence Community is part of a larger system known as the national security community (with Defense, State, the National Security Staff as other components). The national security community, itself, is part of the larger Executive Branch of the U.S. Government, which—in turn—is composed of two other branches of government. In a sense, each component of the IC is like a Russian matryoshka, or nesting doll.<sup>5</sup> We can see, therefore, that any study of an IC component must consider that component as a system that is part of other systems and composed, itself, of various sub-systems.

The study of IC organizations in terms of this kind of process, i.e., in terms of general systems theory, is particularly valuable because it offers a framework that is ideal for treating nested, large, complex organizations and uses a common vocabulary that can unify several social science disciplines associated with the study of both individual and organizational behaviors. It allows the researcher to understand the whole system rather than being limited to explaining the interaction of one or two of the system's aspects (Buckley, 1967, p. 39; Levinson, et al., 1972, p. 27).

To collect relevant data and be in a position to analyze it with the objective of identifying lessons for an Intelligence Community component, the researcher must study the full nature of the intelligence organization—i.e., the researcher must see the organization as an active, unique, changing entity within a particular environment. This approach for organizational assessment is an adaptation of research in the life sciences where the biologist routinely deal with living organisms that are open-ended, evolving systems (Katz & Kahn, 1966, p. 28).

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<sup>4</sup> Sec. 1073 of The Intelligence Reform and Terrorism Prevention Act of 2004 (118 STAT. 3638 Public Law 108-458—Dec. 17, 2004) described the term “intelligence community” to include: the Office of the Director of National Intelligence; the Central Intelligence Agency; the National Security Agency; Defense Intelligence Agency; the National Geospatial-Intelligence Agency; the National Reconnaissance Office; other offices within the Department of Defense for the collection of specialized national intelligence through reconnaissance programs; the intelligence elements of Army, Navy, Air Force, Marine Corps, Federal Bureau of Investigation, and the Department of Energy; the Bureau of Intelligence and Research of the Department of State; the Office of Intelligence and Analysis of the Department of the Treasury; the elements of the Department of Homeland Security concerned with the analysis of intelligence information, including the Office of Intelligence of the Coast Guard; and such other elements of any other department or agency as may be designated by the President, or designated jointly by the DNI and head of the department or agency concerned.

The Director of National Intelligence [ODNI Home page, retrieval 24 May 2013 from <http://www.dni.gov/index.php/intelligence-community/members-of-the-ic>] identified 17 agencies as member of the IC. In addition to the Office of the DNI, the DNI listed them as: Air Force Intelligence, Army Intelligence, Central Intelligence Agency, Coast Guard Intelligence, Defense Intelligence Agency, Department of Energy, Department of Homeland Security, Department of State, Department of the Treasury, Drug Enforcement Administration, Federal Bureau of Investigation, Marine Corps Intelligence, National Geospatial-Intelligence Agency, National Reconnaissance Office, National Security Agency, and Navy Intelligence.

<sup>5</sup> The Russian matryoshka doll (sometimes called a babushka doll) is a series of small wooden dolls nested within larger and larger hollow wooden dolls. One explanation of the origin of the name, matryoshka (or matryona or matriosha), is that it originated from the Latin root, “mater” or “mother” and became associated with the image of a portly-figured peasant mother. Some reports explain that folk artisans in the “children’s Education” workshop, located near Moscow on the Abramtsevo estate, owned by Sava Mamontov, created the first matryoshka in 1890 (Russian Crafts, 2009).

## Applying General Systems Theory for Data Collection

I will now explain how I adapted the general systems framework for use as a tailored lessons-learned systems model to collect and analyze data about organizational behavior and performance. I turned to Nadler & Tushman (1989) to develop this tailored model, which can be helpful for diagnosing organizational behavior. I adapted and expanded their general model into a conceptual framework focused on facilitating the collection and analysis of data associated with the behavior and performance of organizations. The goal is to provide the researcher and analyst with a tool to identify and evaluate lessons from organizational experience. This lessons-learned systems adaptation offers a skeletal framework or structure on which, in Boulding’s (2013, p. 208) words, the researcher can “hang the flesh and blood” of the various aspects of the organization so as to create “an orderly and coherent corpus of knowledge.”

This adaptation of the Nadler & Tushman model can help the researcher avoid a narrow focus typically found in frameworks associated with descriptive summaries and metric assessments. This adapted model provides a framework for a comprehensive, interactive assessment of the organization—an assessment that will better enable the researcher to look for ways to maintain the system in a balanced state.

In this way, the adapted model is a framework that depicts the organization as an open system of systems set within the context of its environment, which is one of the major components of the system. The model has four major components: (1) environment, (2) input, (3) organizational process, and (4) outcome. Each component has two to five subcomponents or domains. See Table 1 for a list of the four major components and their domains.

Each domain has two to six features that define the domain. See Tables 1a through 1d for a listing of each domain and its associated features.

Tables that follow derived from: Nadler & Tushman, 1989; Van De Ven & Ferry, 1980, p. 10-13, 171; and Levinson, et al., 1972, p. 57.

SYSTEM COMPONENT	SUBCOMPONENTS (OR DOMAINS)
Environment	societal associational limitations history
Input	requirements (or needs) funding staffing
Process	formal organization informal organization network of individuals information network task
Outcome	deliverables process changes

**Table 1: Lessons-Learned Systems Model Components**

DOMAINS	FEATURES
Society (the human ecology)	geopolitics domestic politics economics other factors
Associational or Relational Domain (the external alliances and associations)	suppliers users stakeholders
Limitative/ Restrictive Domain (the structural and behavioral constraints)	laws & regulations external oversight fiscal technical other
Historical Domain (the history)	societal organization

**Table 1a: Environmental Component**

DOMAINS	FEATURES
Formal Organization	demographics design components administrative intensity bureaucratic constraints work of organization
Informal Organization	relationships culture influences dependencies certainty
Network of Individuals	demographics education skills experience style affect and motivation
Information Network	dormalization mode frequency quality & content
Task	nature difficulty expertise

**Table 1c. Process Component**

DOMAINS	FEATURES
Requirements (need to be satisfied)	problem objective complexity
Funding (fiscal resources)	amount nature
Staffing (human resources)	level nature

**Table 1b. Input Component**

DOMAINS	FEATURES
Deliverable	nature utility
Process Change	internal external

**Table 1c. Outcome Component**

The components and their domains are organized into a functioning system. See Figure 2 for a macro-level graphic representation of how these components, when adapted from Nadler & Tushman, can be organized into a dynamic systems model for lessons-learned analyses. This macro-level depiction of the system does not display the complexity of the various subsystems. At this macro-level, you can see that the system consists of recurrent cycles of input (from the environment), transformation (by the organizational process), and outcomes (outputs into the environment). This means that the organization functions as a cyclical process with various internal transactions that result in outcomes, i.e., the consequences of the organization's behavior (Katz & Kahn, 1966).

The “process” component that is depicted in the center, is core to the organization's existence, and, as I indicated, it operates within the context of the external environment. The five process domains that I earlier identified—the formal organization, the informal organization, the network of individuals, the information network, and the tasks—accept the input from the environment, process that input internally, and provide output back into the environment as outcomes of the organization's behavior. Notice that the process component is set in the system's external environment, and the input and outcome components are the links of the process to the external environment. In other words, the input comes from the environment, and the outcomes return the outputs into the environment.

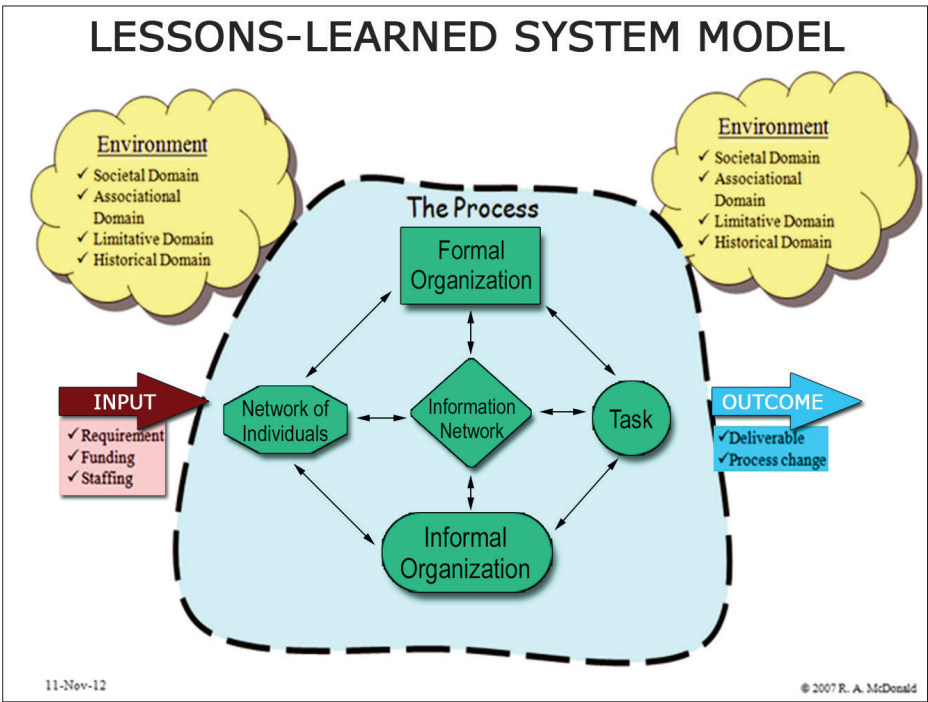


Figure 2: Lessons-Learned Systems Model (Adapted from Nadler & Tushman 1989, p. 47)

My basic theoretical assumption in adapting the Nadler & Tushman model is that any complex organization, like the example of high-performance/high-tempo Intelligence Community organizations, are what Van De Ven & Ferry (1980) described as open social systems that consist of a variety of structures and interrelated processes. These IC organizational systems, whether at the level of an agency or the level of a program office within an agency, operate as a result of its decision makers selecting from a series of iterative choices that arise during the organization's internal processes and relationships with the environment. As I suggested earlier, this is a repetitive cycle of procuring, transforming, and distributing inputs into outputs with the system constrained by the context of its environment. At the same time, it is important to remember that each organizational component has one or more subsystems that in a more detailed analysis must be considered (Van De Ven & Ferry, 1980, p. 6).

I believe it is important to study all components of an organization as depicted in the model—both within the organization's process and within the environment—and use the model as a basis for collecting data about both aspects of the model. This will provide the analyst with adequate information with which to conduct analysis of the organization's performance, i.e., to specify the organization's components and functions, to describe the interactions within the system, to trace those interactions through the organization's transformation process, and to make an assessment about potential lessons. In other words, to conduct lessons-learned analysis. This is where, in the next section, I turn to using congruence theory for the analytical stage.



## Congruence Theory— A Technique for Lessons-Learned Analysis

*“First she lay down upon the bed of the great, huge bear, but that was too high at the head for her. Next she lay down upon the bed of the middle-sized bear, but that was too high at the foot for her. Then she lay down upon the bed of the little, small, wee bear, and that was neither too high at the head nor foot, but just right. So she covered herself up comfortably and fell fast asleep.”*

—From “*The Story of Goldilocks and the Three Bears*” (D’Aulnoy, 2007)

The story of Goldilocks provides us with a metaphor to understand and apply congruence theory to the analysis of systems. Goldilocks looked for the bed with the best fit for her. She tried all three beds, and found the best fit with wee bear’s bed. That is what congruence theory looks for, the best fit within and across systems.

Congruence is the relative degree of consistency or “fit” between pairs of domains (i.e., subcomponents) within the various components of the system. The fit could be between domains within the environment, input, outcome, or process component of the system. Nadler & Tushman (1989, p. 45) defined congruence as “the degree the needs, demands, goals, objectives, and/or structures of one component [of the system] are consistent with the needs, demands, goals, objectives, and/or structures of another component [of the system].”

Congruence theory is a well-founded principle in the social sciences. It has been effectively tested in this regard and is ideal to apply to the analysis phase of our case-study methodology. Scholars in political science, organizational analysis, psychology, as well as other related disciplines, have applied congruence theory to their research. One classic example is from the application of congruence theory to political science. Eckstein argued in his congruence theory of political authority that if non-political authority patterns were congruent or similar, then political stability would be enhanced (Almond, 1996; Almond & Verba, 1963; Eckstein, 1997).

Eckstein (1998, p. 10), explained that congruence can be understood by considering the geometric notion of sameness of form, or isomorphism. In this sense Eckstein pointed out that congruence either exists or does not exist, and never is a matter of degree. In geometry “figures either can or cannot be exactly superimposed.” But, he argued, that may not be the case with political and social systems. For political systems it is unreasonable to expect all the multifarious aspects to have identical patterns on all comparative dimensions (Eckstein, 1998, p. 11).

Because government agencies are organizational social sub-systems of a political system—the nation state—the same principle should apply. Therefore, for government organizations, like other political and social systems, there may be degrees of fit, as opposed to an exact fit. When we apply congruence theory to analysis in lessons-learned research, we probably should employ this more inexact application of the concept, i.e., congruence in terms of having the individual components of the systems being more broadly in agreement with the essentials of the other components, as opposed to an exact superimposition.

In studying any social organization, whether it be a business organization, or religious institution, or a major national security government component like the Defense Department or IC, or a subcomponent government agency, such as the Army or the NRO—each with its own subsystems program offices—we need to consider the organization as a system that must maintain equilibrium (or congruence) among its internal subsystems. That congruence also must be examined for each subsystem’s relationship with its larger parent system, plus the relationship of each individual system with parallel systems with which it might have relationships. If an organization cannot maintain congruence within itself and with its higher level systems or relevant parallel systems, then the organization will become dysfunctional, and may not even be able to survive (Levinson, et al., 1972, p. 4).

Levinson, et al. (1972, p. 4) pointed out that all open systems, whether they be living organisms or social organizational systems, can have problems in adaptation: “Sometimes their internal subsystems do not function well together; sometimes their environments change so significantly that former modes of adaptation no longer work effectively.” Understanding how an organization and its processes are poised to adapt the organization can be helpful in determining why it might become dysfunctional, hence, the value of congruence analysis in understanding the organization’s processes.

It is the organization’s processes—those activities that take in resources, do something with them, and then put out some kind of product or effect—that are central to understanding the organization’s performance, the analysis of which is critical to identifying lessons. The process is at the core of the organization’s performance, and it is the performance of the organization that is key to the organization’s output, which, in turn, is the critical measure of the organization’s success and survival.

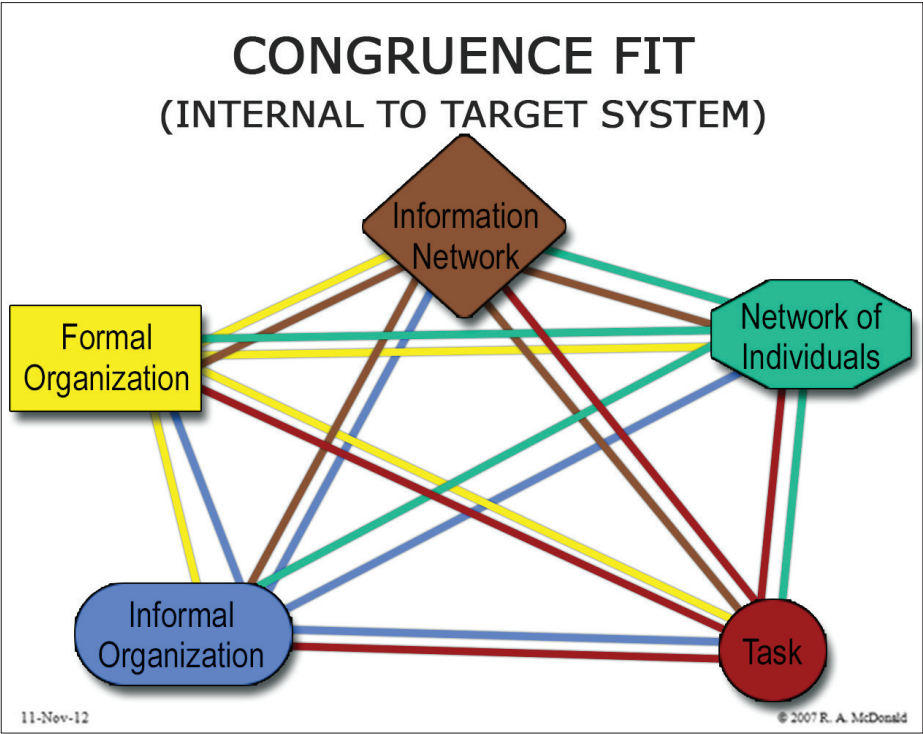
This importance of the system’s process component to the organization’s survival and identification of lessons for success, makes it the one component of the system that always must be analyzed for congruence. Because of this, I will offer a more detailed explanation of assessing the congruence of its domains.

## Assessing Congruence of the Domains in the Process Component of the System

To assess the congruence of the domains in the process component of the system, the researcher needs to evaluate the degrees of fit between each of the processes’ subcomponents or domains. Each of the five processes domains (i.e., formal organizational, informal organization, information network, network of individuals, and tasks) shown in Figure 2 have dyadic relationships with each other. See Figure 3 (on the next page) for a graphic display of these dyadic relationships.

The lines in Figure 3 show the dyadic connections between the five domains. Each of the domains has a two-way relationship with each of the other four domains, which results in four two-way sets of dyadic connections for each of the five domains (e.g., the formal organization has a dyadic relationship to and from the other four other domains: 1—the

informal organization; 2—the information network; 3—the network of individuals; and 4—the tasks). That gives each domain four outgoing and four incoming dyadic relationships for a total of 20 unique dyadic connections. As a part of congruence assessment, the analyst needs to evaluate each of these dyadic relationships.



**Figure 3: Graphic Display of Dyadic Relationships Between the Five Internal Domains in the Organizational Process Component of the Systems Model**

### Questions for Assessing Congruence

The evaluation of these dyadic relationships can be accomplished by asking questions about the relationships. I have developed a question matrix (Table 2) as an example of how to assess congruence within the process component. The analyst could use such a matrix to ask specific questions about each dyadic relationship, the answers to which would offer insight into the degree of congruence. For example, for the two domains “network of individuals” and “information network,” the matrix suggests these two questions: (1) “To what degree can the cognitive capacity of individuals accommodate the flow of information?” (2) “To what degree does the information network provide individuals with the information they require?”

In answering the first question, the analyst would consider the fact that there are limits to the amount of information that individuals can transmit, receive, and process. The analyst

would evaluate the information requirements and assess the degree of congruence between the capability of the network of individuals to process information and then transmit it through the information network. When the capability of the network of individuals to process information is congruent with the nature of the information (i.e., the content, speed, and bandwidth of the information matches the capability of the network of individuals), the organization is more likely to be successful in producing its desired output. When this is not the case, the desired output would be less likely (Katz & Kahn, 1966, p. 257).

DOMAIN	FORMAL ORGANIZATION	INFORMAL ORGANIZATION	NETWORK OF INDIVIDUALS	INFORMATION NETWORK	TASK
Formal Organization		To what degree are the structures of the formal organization consistent with the behaviors in the informal organization?	To what degree does the formal organization make use of individual resources and meet individual needs?	To what degree can the capacity of the formal organization's communication system handle the flow and storage of information?	To what degree do the structures of the formal organization motivate task-relevant behavior and facilitate task completion?
Informal Organization	To what degree is the culture of the informal organization consistent with the goals and rewards of the formal organization?		To what degree does the informal organization make use of individual resources and meet individual needs?	To what degree are the relationships of the informal organization reflected in the information network?	To what degree do the relationships of the informal organization motivate task-relevant behavior and facilitate task completion?
Network of Individuals	To what degree do individuals support the formal organization's goals and make use of the formal organization's resources to support their own personal goals?	To what degree do individuals support the informal organization's culture and make use of the informal organization's relationships to support their own personal goals?		To what degree can the cognitive capacity of individuals accommodate the flow of information?	To what degree do individual skills and abilities match task demands?
Information Network	To what degree is the information network consistent with the structure of the formal organization?	To what degree does the information network accommodate the communication expectations of the informal organization?	To what degree does the information network provide individuals with the information they require?		To what degree does the information network communicate information relevant to the task?
Task	To what degree are the demands of the task compatible with and converge with the mission and functions of the formal organization?	To what degree are the demands of the task compatible with and converge with the relationships of the informal organization?	To what degree does the task meet individual needs?	To what degree are the task's requirements reflected in the flow and storage of information?	

**Table 2: Question Matrix for Assessing Congruence within the Process Component of the System**  
**Sources: Katz & Kahn, 1966, p. 257; Nadler & Tushman, 1989**

## Considering Congruence with Other Components

For most lessons-learned case studies it may be sufficient to limit the congruence analysis to the organizational process component of the model. However in some more complex research problems it might require a congruence analysis across components. You can see the value of this by looking at the external environmental component.

The organization and its processes can exist in an ever-changing environment, and each change would demand the anticipation and execution of relevant responses to those changes. This is an area where the analyst could look for congruence between the changing environment and the subcomponent, network of individuals. (Katz & Kahn, 1966, p. 334).

For example, when the external environment is stable, and we find that the process subcomponent, network of individuals, is a highly defined structure, that process subcomponent would be congruent with the environment, and the process would effectively be able to carry out the organization's mission. Alternatively when the external environment is constantly changing, and we find that the network of individuals remains as a highly defined structure, that subcomponent would not be congruent with the environment, and the process would be less likely to effectively carry out the organization's mission. In other words, when the capability of the network of individuals to respond to the changing environment is congruent with the changes in the environment, the organization is more likely to be successful in producing its desired output. When this is not the case, the desired output would be less likely (Katz & Kahn, 1966, p. 334).

We can see this drawing on the Intelligence Community for an example. High-performance/high tempo

### **Identifying a Lesson through Congruence Analysis A Study in Responding to an Oversight Requirement – Obtaining & Sustaining a “Clean Audit”**

**The Case.** In May 2013, the NRO announced that, for four consecutive years, the NRO had obtained from its independent auditors an unqualified opinion on its financial statements. Congress passed the Chief Financial Officer Act in 1990, which increased the oversight requirement for Federal agencies by establishing the requirement for financial audits. In 1991 the General Accounting Office (GAO) concluded that implementation of the act would be the beginning of a new era in Federal government operations. Federal agencies would now be subjected to the rigorous accounting standards more typical in the more open, transparent, and profit-making world of commerce. This was alien to Intelligence Community agencies, which operated in a world of secrets, where the mission was the focus, and financial accounting a foreign language. The research question was, “How was the NRO able to find success in this cultural change, and obtain and sustain a clean audit?”

**Data Collection.** The lessons-learned systems model (Figure 2) provided the framework for data collection, with the research team focusing on the system components that were most relevant to the audit case, which were the environment's historical domain, the network of individuals, the formal organization, and the information network. The data collection showed that in the early 1990s the NRO was facing its own unique organizational and management challenges. It was disestablishing what had been a 30-year confederation of semi-autonomous, self-sufficient alphabetic programs that were strongly tied to external parent organizations. It was restructuring that kind of organization into a hieratically managed, geographically consolidated, and functionally managed organization. At the same time the NRO was moving from operating as an unacknowledged, highly secretive activity, buried in the hidden world of intelligence operations, into a publicly acknowledged agency, visible to all. While focusing on these management and operational challenges, it did not have a staff with the expertise to address accounting requirements.

**Congruence Analysis.** The analyst's evaluation of the data showed that the network of individuals involved in business management at the NRO was not the best fit for the input requirement of accounting standards as defined in the laws and regulations of the limitative domain. As a consequence of this analysis, a lesson about expertise became apparent, “assign credentialed experts and train the staff.” The actionable insight is, “When the NRO moved to a CFO model with CPAs in key finance positions and implemented staff training in financial management, the finance staff was positioned to obtain a clean audit and could sustain a record of clean audits.”

organizations, such as the NRO operate in a dynamic state of interactions where both the task and environment are in constant change. In one instance the NRO might be dealing with evolving acquisition activities where it must regularly form new networks of individuals with unique skill mixes to match each new acquisition effort. In another instance the NRO might have to continually shift its output goals and work processes in response to ever-changing national security threats from the external environment. In both instances well-defined, static roles for the NRO's formal organization and network of individuals would not be congruent with either the changing task requirements or the evolving environment.

## Labeling the Dyadic Relationships

After assessing the congruence in the system's dyads, the next step is to designate each dyadic connection as either positive or negative, based on the degree of congruence of the relationships. Dyadic connections that are congruent are labeled as positive; dyadic connections that are noncongruent are labeled as negative. The positive dyadic relationships (PDRs) enhance organizational performance; the negative dyadic relationships (NDRs) frustrate successful organizational performance.

The greater the total degree of congruence between the various dyads in the system and the relevant external factors, the more efficacious will be the organization in terms of the degree that the actual outputs are consistent with the desired outputs. This then allows the analyst to develop hypotheses regarding what organizational behavior is most likely to bring the desired results from the organization's performance; in other words, to form hypothesis statements that could be potential lessons (Nadler & Tushman, 1989, p. 45).

The analyst formulates these potential lessons by explaining the contingent organizational behavior that results in either a PDR or NDR. The analyst tests these hypotheses by assessing their utility in explaining or

### Identifying a Lesson through Congruence Analysis A Case Study in IC Integration – Badge Interoperability

**The Case.** In 2007 the Intelligence Community (IC) succeeded in a significant step toward IC integration when it implemented the first phase of security badge interoperability for the "big five" IC agencies (i.e., CIA, DIA, NSA, NRO, and NSA.). This permitted the employees of any one of these agencies to use their agency's badge to gain access to any of the other four agencies, thereby facilitating the sharing of information between agencies. However, it took four years to accomplish this step. There are valuable lessons for other, yet unaccomplished integration tasks. To help identify some of those lessons in this case, a key research question was, "What discernible factors or conditions enabled the success of badge interoperability, a necessary step in the IC's road to the integration of the community's intelligence collection and analysis?"

**Data Collection.** The lessons-learned systems model (Figure 2) provided a useful framework for data collection, with the research team focusing on the system components that were most relevant to the case, in this instance, the environment's historical domain, the geopolitical segment of the societal domain, the network of individuals, and the information network. The data collection showed, among other things, that the IC had attempted, without success, badge interoperability two earlier times over the previous 37 years, once in 1970 and the other in 2000, each period presenting a very different geopolitical environment.

**Congruence Analysis.** The analyst's evaluation of the data showed that in 2003, when the DCI directed badge interoperability for this third attempt, there was a better fit in the system between the environment's geopolitical dimension and the task component of the system (i.e., in 2004, a post-9/11 geopolitical threat made it an imperative for IC agencies to facilitate sharing of intelligence in order to be able to "connect the dots"). As a consequence of this analysis, the lesson about being committed became apparent, i.e., "When the IC commits to addressing a well-defined need, success for interagency programs is more likely." The actionable insight is, "When attempting a task related to IC integration, ICS leadership can increase the likelihood of success by framing the requirement as a national security imperative in light of a threatening geopolitical environment."

predicting the outcomes of phenomena in the particular case under study. In doing this, the analyst must determine whether the differences in case outcomes are causal or spurious. If the potential lesson consistently predicts the case's outcome, that serves as evidence that the potential lesson can be a generalizable explanation of the phenomena; if the potential lesson fails to explain the case's outcome, that argues for discarding this as a potential lesson (George & Bennett, 2005, p. 181-2).

George & Bennett (2005, pp. 6-7) described this step of "hypothesis testing" as "process-tracing" where the researcher attempts to trace links between the possible causes and the observed outcomes. In effect, the researcher must examine the instances of congruence and noncongruence to determine whether the hypothesized cause suggested by the data is revealed in the patterns of congruence and noncongruence in the case. In more direct language, when applying congruence theory to lessons-learned analysis, the researcher is looking for the Goldilocks effect, i.e., the best fit in the various relationships within and external to the organization.

# Integrating the General Systems Paradigm and Congruence Theory into The Case Study Framework

Grandma is baking a cake. She asks the child if he would like a snack, which of course he does.

“Here. Have some cooking oil.”

“Yuck,” says the boy.

“How about a couple of raw eggs?”

“Gross, Grandma.”

“Would you like some flour then? Or maybe baking soda?”

“Grandma, those are all yucky!”

To which the Grandma replies: “Yes, all those things seem bad all by themselves. But when they are put together in the right way, they make a wonderfully delicious cake!”

—From Wisdom Commons web page, by unknown author

In the previous three sections, I described the three lessons-learned research methodology components: (1) the case study framework, (2) the general systems paradigm, and (3) congruence theory. Like grandma's cake, they need to be put together in the right way to make a “wonderfully delicious” disciplined lessons-learned research methodology. The recipe to integrate them into a coherent and successful approach is a three-phased process. After some brief introductory comments about the nature of this integrated methodology, I will describe how to complete each phase.

Using the disciplined, lessons-learned, case study methodology is not pure research for the purpose of developing theoretical social science constructs; rather it is applied research that is comparable to the medical model because of its focus on diagnosis and treatment. There are three characteristics that argue for this similarity: (1) lessons-learned research involves studying organizations that are open-ended, ever-changing systems, which are like the living organisms of medical interest; (2) lessons-learned research has as its objective the assessment of a phenomenon with the identification of lessons for application to future organizational behavior, which is comparable to the medical practice of diagnosis and prescriptions for treatment or continued wellness; and (3) lessons-learned research has as its overall goal providing insight to sustain or improve the organization's process, which is comparable to medical practice where the goal is to use insight from the diagnosis to improve the patient's long-term personal health and well-being.



Like the medical model, the lessons-learned research model is interactive in nature with the success of each step dependent on completing the previous step. Because the organizational system under study is in constant change, the researcher regularly may need to return to a previous step to modify and refine what he or she did in that step. As the researcher observes the changes in the system, the researcher will need to adapt his or her approach to applying the methodology. This makes lessons-learned research closer to the practice of medicine than to research using the classical scientific method.

In the classical scientific method, the researcher typically frames hypotheses at the start of the research and keeps the hypotheses intact throughout the data collection and analytical steps. In the medical model, the practitioner forms hypotheses, but he or she modifies them in the face of a changing system and emerging data. At the same time, the practitioner searches for new data in the face of the evolving hypotheses.

In this way the success of each step clearly is dependent on the researcher successfully completing the previous step, and it may require the researcher to return to a previous step when new insights emerge. In other words, the three phases and their steps in the research process are separate, but interrelated.

Whereas the medical model may be more open-ended because it deals with a living organism, the methodology for lessons-learned research is more structured because it deals with a more abstract organizational system. It is composed of three phases that integrate the case study framework with general systems paradigm and congruence theory: (1) developing the research design; (2) preparing the description of the case or cases; and (3) conducting the lessons-learned analysis. Each phase has three or four steps, which you can find outlined in Table 3, and discussed in more detail immediately following the table.

Phase I—Developing of the Research Design	
1	Defining the Research Problem
2	Selecting the Case or Case(s) to be Studied
3	Developing the Research Schedule and Spend Plan
4	Writing the Research Design
Phase II—Collecting Data and Preparing the Case Description	
1	Collecting Data
2	Reviewing the Collected Data
3	Writing the Case Description
Phase III—Conducting the Lessons-Learned Analyses	
1	Assessing Congruence and Noncongruence
2	Formulating Tentative Lessons as Hypotheses
3	Testing Hypotheses and Identifying Lessons
4	Writing the Lessons-Learned Case Assessment

**Table 3: Case Study Research Phases**

## Phase I—Developing of the Research Design

The research-design phase may be the most critical. It provides the foundation and direction for the two remaining phases of research. It focuses the inquiry, defines the scope of the research strategy, and structures the timeframe for the research.

The researcher must first clearly define the problem prior to being able to select the case that he or she will study. A clear definition of the research problem gives direction to overall development of the research and provides a framework for selecting the case for study. This ensures that the selected case supports the research objective. The writing of the research design is dependent on, and a reflection of, this analytical process.

Not only must the case that the researcher selects be responsive to the research problem, but also the overall research design must be sustainable by the available resources. In other words, the scope of the research must be feasible within the level of allocated resources and available time.

As the researcher encounters the data and becomes familiar with the phenomenon under study, he or she also may have to initiate iterations and respecifications of the research design. New data and evolving analyses might offer new insight into the problem and expose additional areas for inquiry that will demand adjustments to the research design. The researcher may have to return to phase I to interactively refine the problem statement, modify the case definition, and adjust the research.

Unlike some other social science researchers whose work is experimental or theoretical in nature, the lessons-learned researchers should not be surprised if additional insight occurs well into the research with the researcher having to suspend work and redesign the study more than once. This is the nature of research that studies a dynamic organizational system. Suspending work and redesigning the study in response to new data and ongoing analyses will increase the likelihood that the lessons-learned research project will produce results that are valid and generalizable (George & Bennett, 2005, p. 88)

The key to success in Phase I is to address completely and interactively its four interdependent steps—(1) define the research problem, (2) select the case or cases to be studied, (3) develop the research schedule and spend plan for the research project, and (4) write the research design plan. Here are some considerations for dealing with each of these steps.

**Defining the Research Problem.** The research problem is the broad research question that the researcher is seeking to answer. It should be a concise statement of the question or issue that gave rise to the research. The question should relate to the kind of lesson the researcher is seeking to learn. For example, if the researcher is trying to learn lessons about the kind of strategy that resulted in the development of a technical intelligence collection system ahead of schedule, the researcher might frame the research problem in the form of this kind of question: “Why was the Agency able to deliver ‘program A’ one year ahead of schedule, while it delivered ‘program B’ two years late?” (Bromely 1986, p. 72)

Defining the problem and associated research objectives is the most important step in designing the research. This step establishes the constraints of the study and focuses the nature

of the research. If the researcher creates a well-reasoned, clear statement of the problem, then this will move the research in the correct direction (George & Bennett, 2005, pp. 74, 79).

The researcher needs to be careful not to define the problem too broadly, or he or she will risk losing important differences among the factors under study. At the same time, the researcher needs to take care not to define the problem too narrowly, or the researcher might unnecessarily limit the scope and relevance of the study. Finally, the researcher needs to view the problem statement as a tentative research question and remain open to future refinements during the course of the study as the researcher collects data and conducts analyses (George & Bennett, 2005, pp. 74, 79).

**Selecting the Case or Case(s) to be Studied.** The case or cases that the researcher selects for analysis should be a specific incident or process that is typical of the phenomenon to be studied. Lessons-learned researchers could begin the selection process with a predetermined case in search of a lesson to be identified or a lesson in search of a case with which to test a hypothesized lesson. Either approach should work.

The researcher should select a case that is consistent with and can become an integral part of a research strategy focused on achieving the objectives of the study. The selection criteria should not be that the case is interesting, important, or has readily available data for research. The selected case must focus on a narrow, specific issue that is associated with the phenomenon under study. The issue or incident must be constrained by limits both in time and space; it should not be a broad, comprehensive history of the phenomena. The researcher should not select a case that reflects an anomaly that falsely supports the viability of a lesson that is not generalizable to the population of experiences. The researcher also needs to take care to avoid bias from any internal or external sources when selecting the case (George & Bennett, 2005, p. 83).

As part of the case selection process, the researcher must determine if the research project is to be a single-case study that examines one incident or a comparative case study that compares two or more incidents. The researcher should base this decision on his or her understanding of the research question and associated research objectives that he or she defined in the previous step of this phase. Because of the complexity of systems-based case studies it might be best to study one case, or at the most, compare only two cases when doing comparative case studies. Depending on the research objectives, comparative case studies can involve cases that either are instances of the same subclass of events or different subclasses. The pair could be before-after instances within the same organization, or they could be the most similar or the least similar organizations involved in similar or dissimilar instances (George & Bennett, 2005, p. 83).

During the course of the research study, especially during the next two phases, the researcher might find reason to move away from the initial case or cases that he or she selected. It may be necessary to return to the step for selecting the case and select a better case to support the research question. For example, the initially selected case might draw a researcher to a particular hypothesized lesson different from the preliminary assessment. After initial data collection and analyses, the researcher might gain insight that would move him or her away from the initially selected case to another case or series of cases that might appear to be more

appropriate to test the validity and universality of that lesson (George & Bennett , 2005, pp. 38, 83-84; King, Keohanne, & Verba, 1994, pp. 17-18).

**Developing the Research Schedule and Spend Plan.** The development of the research schedule and spend plan makes explicit the available resources, and brings them together with the research strategy in the form of a project timetable. This is that part of developing the research design where the researcher determines how realistic and feasible the research objectives are, given the available resources and allocated time. This step answers questions such as: does the researcher have sufficient resources to accomplish the research; can the researcher complete the research project in time for the findings to be useful; does the researcher have to go back to the problem definition to reduce the scope of the project to match the resources and satisfy the time requirement for delivery of the results?

As with the other steps of this phase of the research, the researcher might find it necessary to return to this step later in the research study in order to adjust the schedule or modify the spend plan. There could be a whole range of reasons for this. The researcher might find that data collection is taking longer or is being completed more quickly; he or she might find that more or less funds are necessary to accomplish the research project; unanticipated events might occur; or the organization might change in a way that would make it more or less urgent to deliver the results. Because of the uncertain nature of the research schedule and funding requirements, the researcher should seek to build flexibility into the research schedule and spend plan to accommodate these unanticipated factors that inevitably will occur during almost any research study.

**Writing the Research Design.** This step involves the actual drafting of the research design. The written research design should be relatively brief and address six areas: (1) the research problem, (2) definition of terms, (3) scope of research (including identification of the selected case), (4) methodology, (5) research schedule, and (6) spend plan. (See Appendix A for a research design outline with questions to consider.) The statement of the problem should be a concise statement and include a one- or two-paragraph background summary. The case selection discussion in the “scope” section should include a brief summary of the rationale for selecting the case and an explanation of whether the study will be a single case study or a comparative case study. The methodology portion briefly should explain how the researcher will apply the disciplined lessons-learned research methodology to the particular case under study. The funding and schedule portions of the design should be a brief outline of the spend plan and project schedule. As you can see, the emphasis is on a “brief, but focused” product. The researcher should use his or her energy on the creative and analytical processes in preparing the research design, rather than writing unending prose.

## Phase II—Collecting Data and Preparing the Case Description

In order to describe the case, the researcher first must collect relevant data about the case. All case data, however, are embedded in the historical and environmental domains in which the organizational system existed at the time of the events relevant to the case. The various

environmental domains—societal, associational, restrictive, and historical—shape and limit the data that can be collected about the case. The researcher needs to be conscious of those limitations and how they structure the availability of case data.

The data collection for the case also is influenced by a parallel series of environmental domains—those that are prevailing at the time of the research. Each datum from a past event will be interpreted in terms of the more current environmental domains that exist during the time of the data collection. The nature of these more recent environmental domains already will have influenced the initiation of the case study. During data collection, they additionally will influence: the selection of data, the perspective for evaluating collected data, and the framework of norms and values that will be used to identify the lessons. The implementation of the lessons, within the context of those norms and values, will, in turn, influence the future performance of the organization. This is why the collection and evaluation of data in this phase of the research are so critically important (Bromely, 1986, p.267).

Data collection involves describing all relevant aspects and interactions of the system, and it can become the most laborious and detailed aspect of the research. This phase of the lessons-learned research project focuses on both collecting the data by conducting a broad-based examination of the organizational system that is associated with the case incident. The goal is to identify the factors that will serve as the basis to formulate lessons-learned hypotheses. This phase of the research has three steps: (1) collecting the data to learn about the organizational system, (2) reviewing collected data, and (3) writing a descriptive case study based on the collected data.

**Collecting Data.** This step involves the collection of detailed data about the organizational system under study. The collection of data is a central step in conducting lessons-learned research. The collected data should be empirical evidence that is relevant, confirmable, and reliable. The data collection step should result in compiling considerable documentary evidence. However, the researcher needs to avoid filtering the data and making any interpretations, inferences, or assertions that go beyond the empirical evidence. Those activities should be deferred to the analytical stage when the analyst will need to examine the data critically. If the researcher collects sufficient relevant, detailed, confirmable, and reliable data, it will assist the researcher in formulating and testing hypotheses as he or she moves through the later research phases (Levinson, et al., 1972, p. 7; Bromely, 1986, pp. 69, 71-72).

The researcher needs to ensure that he or she collects data for all decisive points in the case narrative and anchors those points by supporting the associated observations with documentary evidence. The collected data must be comprehensive, to include details not only about the system, but also about its environment, which includes its history. Research evidence has shown that individuals select, interpret, and make decisions based on the context of the environment. The environment, with its history becomes a major component in determining the frame of reference for all subsequent analyses. The frames of reference become “the internal standards or cognitive filters a person uses” in evaluating a situation and making analytical decisions (Van De Ven & Ferry, 1980, pp. 56-58; Bromely, 1986, pp.69, 71).

Referring to the lessons-learned systems model (Figure 2) during data collection can help the researcher become aware of latent cognitive filters and ensure that the researcher considers the full range of potential data that may be embedded in the organizational system, i.e., within the process, the environment, the input, and the outcome. Use of the model also can help the researcher in formulating data collection questions that might be unique to the case, in organizing the collected data, and in uncovering insightful relationships between data elements (Levinson, et al., 1972, p. 7).

I have identified a set of comprehensive, normalized questions that the researcher can use as a baseline for initiating data collection. I have listed them in Appendix B (Data Collection Framework and Examples of Questions). They offer a methodical and comprehensive way to address the relevant aspects of the lessons-learned systems model (Figure 2) in terms of the way the specific case operates. The use of these normalized questions can serve as a checklist to help ensure standardized data collection with analogous inquiries, both within the case and across cases. This will allow for the comparability of data and help ensure that the data can be accumulated, matched, and systematically analyzed in the subsequent steps of research (George & Bennett, 2005, p. 86).

When answering the data collection questions, the researcher should use all available sources for data collection: documentary material (publications, transcripts, and photographs), archival records (government and corporate), correspondence (written, electronic, and recorded), surveys (psychometric measurements and other social science assessments), recollections (memoirs, interviews, and oral histories). When selecting data sources, the researcher should give preference to original, primary sources,<sup>6</sup> rather than secondary sources.<sup>7</sup> For the most part, the researcher should avoid relying on tertiary sources (Bromely, 1986, pp. 71-72).<sup>8</sup>

Although primary sources are the ideal for data collection, they can produce information with inaccuracies. Any individual primary source requires validation from other firsthand, contemporaneous primary sources, which could be documented in the form of written records, digital files, photographs, or multi-media recordings. Secondary documentary material—such as contemporary secondhand accounts and subsequent scholarly assessments—also can be helpful in evaluating primary sources. In addition, they can facilitate the researcher's understanding of the context in which the case operates and help raise questions about the accuracy of the primary sources (George & Bennett, 2005, pp. 96-97).

One very common approach to collecting primary source data is to use oral history interviews. This method is at risk of collecting spurious data for a number of reasons. The

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<sup>6</sup> Primary sources are original reference materials from the time period involved. They would not have been filtered through interpretation or evaluation over time. They usually are the first formal documentation of new information, original thinking, or a discovery recorded in physical, print or electronic format (UMD, 2012).

<sup>7</sup> Secondary sources are interpretations and evaluations of accounts in primary sources written after the fact with the benefit of hindsight. They are not evidence, but most often discussions or commentaries about evidence (UMD, 2012).

<sup>8</sup> Tertiary sources are collections of information that are a distillation of primary and secondary sources (UMD, 2012).

interviewee's perspective can be influenced by innate biases; the interviewer might have created questions that were affected by his or her own biases; or there may have been fundamental flaws in the design and structure of the oral history interview process. See Appendix C (Interview Protocol) for guidelines on conducting interviews to minimize these kinds of errors (Bromely, 1986, pp. 71-72).

**Reviewing the Collected Data.** The purpose of this step is to fill in any gaps in the collected data. During this step, the researcher first reviews the systems model (Figure 2) as applied to the organization under study. The researcher then examines the collected data using the standardized questions as a check list (Appendix B) to identify gaps in the collected data. The research needs to verify that he or she has collected all the data that would be essential to describing and understanding the case. Should any data be missing, the researcher needs to return to the data collection step, and fill in the gaps.

**Writing the Case Description.** This step involves writing a description of the system being studied; it is the descriptive case study. The descriptive case study should explain the entire system (Figure 2), the organization's process, its environment, the input for the process, and the outcome of the process. The researcher should include sufficient detail about the system in order to be in a position to conduct the lessons-learned case assessment in Phase III of the research process. Refer to Appendix E (Outline and Checklist for Case Description) for guidance on drafting a narrative case description.

## Phase III—Conducting the Lessons-Learned Analyses

The lessons-learned analyses may be the most difficult part of the research project. This phase is fundamentally an analytical and writing activity. It focuses on developing and testing the lessons-learned hypotheses. It has four steps: (1) assessing congruence; (2) formulating lessons-learned hypotheses; (3) testing hypotheses and identifying lessons, and (4) writing the lessons-learned case assessment.

**Assessing Congruence and Noncongruence.** This step involves a three-part process: (1) to assess the congruent fit of domains within the system's process component (i.e., the congruence of the dyadic relationships of the domains that are part of the process component as shown in Figure 3 on p. 18 in this publication—i.e., the domains of formal organization, informal organization, network of individuals, information network, and task); (2) to determine if—other than in the process component—there are any other relevant dyadic relationships that need to be assessed for congruence (i.e., the need to assess domains in the other system components as shown in Figure 2 on p. 14 in this publication— i.e., the environment, the input, and the outcome); and (3) if there are other dyadic relationships that need to be assessed, to assess them.

As I explained in more detail earlier, when the researcher is evaluating dyadic relationships, he or she is looking for both (1) congruent, or positive dyadic relationships (PDRs)—those that enable and enhance optimal organizational performance, and (2) any non-congruent or negative dyadic relationships (NDRs)—those that frustrate the organization from meeting its goals—i.e., block or distort optimal organizational performance.

When assessing congruence within the process component of the system, the analyst will be evaluating the fit between each dyad within the process' domains. A question matrix, such as in Table 2 (p. 19 in this publication), can be helpful in identifying PDRs and NDRs in the process domains.

When assessing congruence in the domains of components other than the process component, the analyst should consider asking two fundamental questions: (1) to what degree does this dyad reinforce organizational performance, and (2) to what degree does the dyad block or distort the system's output and contribute to the organization's production failures? The answers to these two questions will be helpful in identifying PDRs and NDRs for these components of the system.

The compilation of PDRs and NDRs from the analysis of dyadic relationships becomes the basis for formulating lessons-learned hypotheses.

**Formulating Tentative Lessons as Hypotheses.** This is a critical step where the analyst develops tentative lessons to serve as hypotheses to be tested in the next step. It involves formulating into generalized lessons, specific explanations for the effects that resulted from congruence and non-congruence in the system.

The analyst should formulate the lessons in a behavior/consequence phraseology, i.e., state a conditional behavior (by an individual or organization), and then state a contingency consequence that results from that behavior. This puts the lesson in an operational form that is actionable for the individual or organization. Two hypothetical examples of such a statement would be: "When a manager limits his or her direct reports to a number less than 10, the manager will have better communication and control in the organization." "When a supervisor delegates the whole task to a single employee, the employee more frequently completes the task in a timely manner."

By definition, when a dyad comparison results in an NDR, it implies an output failure related to a behavior that the organization (or individual) should avoid. However, the analyst should seek to formulate the behavior/consequence lesson for avoidance in a positive way. Looking at an example from early childhood learning, the analyst would avoid formulating the lesson this way: "When a parent prevents a child who is learning to walk from taking the risk of falling, the child will not have an opportunity to attain balance and will take longer to learn to walk." The preferred positive formulation for the lesson would be, "When a child who is learning to walk is given the opportunity to risk falling, the child is more likely to attain balance and learn to walk quicker."

The analyst will next test the hypotheses that he or she developed from the congruence analysis.

**Testing Hypotheses and Identifying Lessons.** This is the core step in this phase where the researcher tests the validity of the hypothesized lessons. To test the hypotheses, the researcher should evaluate the hypothesized lessons using the case description from Phase II. The case description will contain evidence that either supports or rejects the hypothesis.



The hypothesized explanation only can be considered a lesson when the analyst can point to consistent empirical data that supports the hypothesized generic lesson.

The researcher must take care when explaining the causes of the organization's performance. First, the researcher must avoid relying on correlations as the only basis for explaining an organization's behavior—correlation is not necessarily a reflection of causation. Second, the researcher must consider the role of equifinality and multifinality in identifying and explaining system outcomes. In equifinality, a given system outcome can be reached from any number of paths. In multifinality, similar initial conditions may lead to dissimilar system outcomes.

Finally, the researcher must be cautious to avoid inadvertently identifying spurious lessons. George & Bennett (2005) identified one example of a spurious lesson in a case where the researcher observed that organizational decision-making was decisively affected by the absence of a key participant who had become ill. A spurious conclusion would be to frame the lessons with this statement, "When key decision-makers are free of illness, the quality and timeliness of decision-making is more likely to improve." Alternatively, this might be a better lessons statement, "When all key participants are present, the quality and timeliness of decision-making is more likely to improve" (George & Bennett, 2005, p. 92-3).

**Writing the Lessons-Learned Case Assessment.** This step involves writing the lessons-learned case assessment (See Appendix F - Outline for Lessons Learned Case Assessment). As with the case description, this report should state its main points at the beginning. In particular, this first part of the report should highlight the generalizable lessons learned from the research. It also needs to include some number of empirical examples drawn from the descriptive case summary to support the hypothesized general lesson. If the statement of the general lessons is so generic as to lack actionable specificity, then the analyst should frame a secondary lesson that would be more specific to the case and would offer actionable insight.

Both the statement of the general lessons and the statement of any actionable insights should be formulated in the behavior/consequence phraseology that I discussed earlier. The analyst also should explain the analytical rationale that lead to the formulation of the lessons.

In the final section of the written case assessment, the analyst also should identify some of the unanswered questions and identify any areas for further research. Because of the tentative nature of all social science research, this final section of the case assessment also should provide an evaluation of the research and a statement on the level of confidence for the findings. Much of the uncertainty in the research may come from the inherent flaws in social science research, which I discuss in the next section.

# Inherent Flaws in Lessons-Learned Research and its Methodologies

*“Watch out, Achilles, for although you are a mighty warrior, you are still just a mortal man.” Achilles ignored Apollo and fought on with savagery. . . . Atop the safety of the city walls, Paris sat with his bow and arrows. He drew a single feathered arrow from his quiver . . . and inserted it in his bow. When Paris let the arrow fly, Apollo, the god of archery, used his great powers to guide the arrow so that it hit Achilles in his heel. This was the one spot on his body where Achilles was vulnerable. Achilles fell back on top of the bodies of many slain warriors. Soon his eyes, too, misted over in death, and he died, just as was fated. “*

—From *The Iliad and the Odyssey in Greek Mythology* by Karen Bornemann Spies, 2002

All research methodologies have their vulnerabilities, just as Achilles had a fatal vulnerability in his heel. The lessons-learned case-study methodology that I have outlined is not unlike any other social science research methodology; it suffers from inherent flaws characteristic of the social science and history disciplines. The analyst must avoid the arrogance of Achilles, lest the flaws in the methodology destroy the research as the arrow did Achilles. There are two categories that are of particular importance and make the methodology most vulnerable. One is related to data errors that arise during data collection, and the other is related to the cognitive errors that occur during analysis. These deserve further discussion, and I will briefly discuss them in the next two sections.

## Data Collection Errors

Lessons-learned analysts draw on a wide range of data that includes current records, historical documentation, and personal information. Dealing with any of these kinds of data potentially is problematic. Data errors can arise from two sources—either from deficiencies within the datum or from the assumptions the researcher makes as he or she collects the data. There are four data errors that the researcher could make: assume that answers are in the available records; rely on an apparent single authoritative source; find the complete record unavailable; and collect unreliable data (George & Bennett, 2005, p. 95).

**Assume that Answers are in the Available Records.** The available records may include previously conducted lessons-learned analyses or after-action reports; however, if the researcher assumes that the answers in those reports are the correct answers for the current research, that can lead to data collection errors. First, the assessments in previously conducted after-action reports and other historical inquiries are dependent on either the specific questions that those earlier investigators asked or dependent on the context of their earlier inquiries. These earlier assessments may not be consistent with the current research question. Second, the earlier investigators may not properly have weighted the evidentiary significance of the

data they reviewed, or they may not have asked the full range of research questions appropriate for the general systems model. As a result, the current lessons-learned analysts must be careful not to take for granted that these earlier inquiries provide the answers to the current research questions. They must look for gaps in any earlier inquiries, particularly with regard to answering the research questions in the general systems model. They must seek not only to fill any gaps in earlier research, but they must independently evaluate all the relevant available data (George & Bennett, 2005, pp. 96, 99).

**Rely on an Apparent Single Authoritative Source.** Relying on a single source of what appears to be authoritative data can be problematic. For most cases of high interest, there are at least some after-action reports or case histories that appear to be authoritative reviews of the case. These reports can be misleading in the current research if the lesson-learned analyst heavily relies on them as background narratives to extract neutral data for framing the problem or testing hypotheses. These earlier reports tend to be accounts of the events that are based on the original author's perspective. They are written from the perspective of that author's personal commitment to his or her world view of the issue, and that author's methodological decisions that governed his or her research. While they may be flawed, they can prove useful. The lessons-learned analyst can look for opportunities to translate historical narratives and after-action reports into competing hypotheses to challenge his or her own tentative assessments (George & Bennett 2005, p. 95-96).

**Find the Complete Record Unavailable.** One of the most limiting aspects of historical and lesson-learned research is the unavailability of the entire set of documentary records for the organization's history. As a result, the collected data will be incomplete and not tell the full story. This could be the result of a variety of factors. First, for many organizations, the records may not have been preserved—and if preserved, not consolidated, indexed, and archived. This especially could be case for when an agency or business organization was restructured, consolidated, or disbanded over its history, and as a result the records may have become dispersed or lost. Second, when the records are predominately in digital form (such as in e-mail), those records may not have been incorporated into the formal records management system and subsequently incorporated into the organization's archive. Third, because of the contemporary nature of analytical lessons-learned research, many of the most relevant records may not yet be available in the archive because they still are in use. These factors make it imperative that during the research stage, the analyst take into consideration that the available data reveal only part of the story, and the analyst must be persistent in looking for additional data sources. During the assessment stage, the analyst must take into consideration the possibility that gaps continue to remain in the collected data, and these gaps are likely to influence the analysis. The analyst must keep asking the question, "What data are likely to be missing, and how is this influencing my analysis?"

**Collect Unreliable Data.** Some of the data that a researcher collects may prove to be unreliable, whether they be based on scholarly and scientific secondary sources or drawn from primary source documentary records and personal recollections. With regard to secondary

sources, the authors may have done incomplete or biased research. When we look at primary sources, which we might expect to be more accurate and reliable because they are first-hand records, we find that they can be equally flawed. The originators of primary source documentary material could have entered distortions into the record either consciously with the intent to deceive or unconsciously as a result of cognitive biases. Any information in a primary source could be corrupted by perceptual errors, be documented out of context, or be based on hearsay, rather than being derived from first-hand observations (Bromely, 1986, p. 71; George & Bennett, 2005, pp. 99-101).

Memory can present a more problematic challenge when dealing with primary sources, especially those that rely heavily on personal recollections, such as oral history interviews, autobiographies, memoirs, and diaries. The information in these kinds of sources, all of which are memory dependent, can be flawed because of the introduction of a range of errors that are inherent in the memory process. Appendix D is a commentary on memory and offers some insight into the range of errors associated with memory and recall.

DATA ERROR	EXPLANATION OF ERROR	QUESTIONS TO MINIMIZE ERRORS
Assume Answers are in Available Records	Assuming data in the records contain answers to the questions in the current research	What is the validity of the records in the archive under study?
		For what purpose did the author(s) create the record(s)?
		How do the records fit into the process under study?
		What is the relation of the information in the record(s) to the stream of other communications and documentation?
Rely on a Single Authoritative Source	Relying on what appears to be a single definitive authoritative source	How relevant is the information in the source to the current research question?
		How objective was the collection of data for this "authoritative source"?
Complete Record Unavailable	The entire sent of documentary records is not available	How likely is it that the available data reveal only part of the case story?
		What data are likely to be missing?
		How is the information that is in the available records influencing the search for additional data?
		What information might be missing from the record?
		How is the limited amount of available data likely to influence the subsequent analysis?
Collect Unreliable Data	Some of the data in the documentary record or interview transcripts may be unreliable	What distortions might the originator of the data have introduced into the record?
		What was the objective of the originator of the record in preparing the record?
		What were the biases of the interview subjects?
		What is the likelihood that the source of data could have entered self-serving information into the record?

Table 4: Questions to Minimize Risks From Data Errors

## Avoiding Data Collection Errors

The analyst must assess the evidentiary worth of all data in terms of not only what was preserved in the actual record, but also in terms of the context and purpose of what was preserved. The lessons-learned analyst should evaluate who is speaking to whom, for what purpose and under what circumstances. Knowing the purpose for which the original drafter prepared the document or conducted the interview should offer insight into its reliability. Often originators of documentary records and participants in interviews desire to enter self-serving information into the historical record. The analyst must carefully assess these error sources. Table 4 is a guide dealing with data collection errors. It lists the four data collection errors I discussed in this section, explains the errors, and offers a series of questions that you can use to help minimize the risks associated with data collection errors.

## Cognitive Errors

Cognitive errors are the result of distortions and biases in our thinking as we search for answers to understand our environment. These errors are difficult to guard against. Groopman (2007a) reported that physicians experience these kinds of errors when diagnosing illnesses, yet the physicians typically are unaware of their faulty thinking and the consequent errors in their assessments. I would suggest that this phenomenon also occurs with other analytical thinkers such as social scientists, historians, and intelligence officers (Groopman, 2007a, pp. 40, 147, 263).

There are several opportunities where different kinds of cognitive bias can become introduced into lessons-learned analysis. I will briefly discuss six examples of cognitive error: categorical thinking bias, rationality assumption error, tribal moral community bias, cognitive dissonance bias, anchoring errors, and search satisfaction error.

**Categorical Thinking Bias.** Categorical thinking bias is where the analyst distorts his or her ability to see differences and similarities between facts as a result of placing the facts in categories and paying too much attention to the categorical boundaries. When humans analyze complex subjects, we think categorically about the information and assign labels to the concepts in order to simplify and explain the phenomenon. For example, we arbitrarily organize the visual electromagnetic spectrum into arbitrary categories that we label as discrete colors. Yet the spectrum is continuous. Arbitrary divisions often can result in different conclusions. We could divide the following nine letters into three arbitrary categories: “Cho,” “Pho,” and “Use.” Alternatively, we arbitrarily could place them in two categories: “Chop” and “House.” To compensate for this potential bias, the analyst must avoid focusing on category boundaries and think broadly rather than categorically (Sapolsky, 2005).

**Rationality Assumption Error.** Rationality assumption error occurs when the analyst assumes a more rationale process than may be justified by the data. This easily can occur when the analyst attempts to reconstruct a decision-making process and looks for an orderly process with a univariate explanation. Typically it is not the case that there is a single, clear explanation for the phenomenon. To avoid this error, the analyst should turn to the systems model for help in identifying the range of multivariate factors that may be influencing the process (George & Bennett, 2005, p. 98).

**Tribal-Moral Community Bias.** Tribal-moral community bias is a narrowing of the focus of research that results from being part of what Haidt (2011) called a “tribal-moral community [united by] sacred values.” Any profession (e.g., military, intelligence, engineering, legal, social science, and history) over time could come to embrace certain values that have a moral underpinning. The members then can come to ascribe to what has become the moral value of that professional “community.” The community could have come to subscribe to a particular philosophy, favor a particular political point of view, or adopt a particular set of religious values. The lessons-learned analyst often is a member of a variety of communities and is subject to the bias of any one or more of those multiple communities. If the researcher “circles around sacred values” of a particular community, the researcher might embrace specific research whenever it supports the “moral community’s” values, but ignore it whenever it threatens those sacred values. To mitigate against this bias, the researcher must assess the perspective of his or her own moral communities, make those often unknown “sacred values” explicit, and attempt to conduct research independent of those values—a difficult task (Haidt, 2011).

**Cognitive Dissonance Bias.** This is a bias where the analyst more readily accepts new information that is consistent with his or her existing mind-set and rejects data that are inconsistent with his or her existing mind-set. In this way, the analyst eliminates potential cognitive dissonance, i.e. avoids the discomfort of holding disparate points of view. As a result, the analyst will tend to reject information that challenges the existing mind-set and have a much higher threshold for accepting data that are consistent with existing assessments. To mitigate against this bias, the lessons-learned analyst needs to be open to revising initial assessments in the face of new data, even for what might appear to have been definitive explanations (George & Bennett, 2005, p. 99).

**Anchoring Errors.** Anchoring errors are what I see as a collection of similar errors where the analyst latches onto a single possibility and fails to consider the range of possibilities—i.e., “throws down an anchor” where the analyst believes it needs to be. These “anchoring” errors can contribute to serious flaws in analysis. I will cite five variations of anchoring errors: early-find anchor error, availability anchor error, confirmation anchor error, attribution anchor error, and affective anchor error (Groopman, 2007a, p. 65; Groopman, 2007b).

*Early-Find Anchor Error.* This is the case where the analyst anchors the initial data that he or she comes to see as the “definitive evidence.” Groopman (2007a) argued that these typically are the data that the analyst first encounters. In this error the analyst makes a quick judgment and “shoots from the hip.” In the medical field this is most common in hospital emergency departments. In the intelligence field it is most common in indications and warning (I&W) watch centers. Both are settings where the analyst has to make “life and death” assessments with short deadlines (Groopman, 2007a, p.75).

*Availability Anchor Error.* This is an anchoring error where the analyst has a tendency to make a judgment about the likelihood of an event by the ease with which relevant examples come to mind. For example, if a large number

of satellite launches fail because of fuel contamination, the analyst is more likely to focus on fuel contamination as the key contributing factor in the next failure. An example from imagery analysis would be where the analyst who recently has located a series of terrorist camps subsequently interprets what he or she sees as indicators of a terrorist camp and stops analysis at that point, failing to consider other possibilities that might be better explanations. Availability anchoring error is particularly likely in cases where there are similarities in data, which can result in analysts ignoring key differences. For example, when a law enforcement officer investigates a teenage death, the investigator—who recently may have investigated a series of suicides might ignore the signs of a complicated accident or foul play that might have caused the death, (Groopman, 2007a, pp. 64-65, 188; Tversky & Kahneman, 1973, pp. 207-232).

*Confirmation Anchor Error.* This is an error where the analyst confirms what he or she expects to find by selectively accepting or ignoring information. Groopman called this “cherry-picking” data and described it as wishing for a certain outcome. An example from a military operation would be where a reconnaissance patrol looks at its map and studies the terrain only to see landmarks that it expects to see and neglects those that would correctly tell the unit that it is on the other side of the border. The faulty reading of the map “confirms” the mistaken assumption that the unit anchored (Groopman, 2007a, p. 65; Tversky & Kahneman, 1973).

*Attribution Anchor Error.* Attribution anchoring error is similar to the confirmation anchoring error. However, in the case of attribution error, the analyst attributes the phenomenon to a similar stereotypical or representative case. Analysts typically rely on pattern recognition and draw on pattern stereotypes to make assessments. For example, when a patient is intoxicated, the physician could attribute a set of symptoms to cirrhosis of the liver when the actual cause could be a more unusual condition like Wilson’s disease that has symptoms that include clumsiness, difficulty speaking, and jaundice (Groopman, 2007a, pp. 45 ff).

*Affective Anchor.* Affective anchoring resembles confirmation anchoring in the selectivity of examining data. It is the tendency for the analyst to prefer what he or she hopes will happen over the less appealing alternatives. The analyst tends to lull him or herself into thinking that what he or she wishes for will occur when he or she gets the first suggestion, however fragmentary, that the wish will come true. It is driven by the expectation that the initial, more desirable hypothesis was correct (Groopman, 2007a, pp. 47, 65).

To mitigate against anchoring errors, the analyst needs to ask questions that would prompt the analyst to recognize the anchor and then move to other explanations—to move away from the most available and “preferred” explanation. The analyst should keep asking

the question, “Is it possible there is more than one explanation?” This question should trigger consideration of multiple causes and assist the analyst in casting a wider net of thinking and asking additional questions not posed earlier in the analysis. One of the most effective ways to counter these errors is to generate a list of alternative explanations, even when there is a high degree of certainty of the hypothesis (Groopman, 2007a, p. 66).

**Search Satisfaction Error.** This error is where the analyst stops searching when he or she uncovers a major finding, even though there may be multiple causes or parallel causes. For example, a complex engineering project might have failed because of insufficient funding but the absence of experienced engineers also could have been a major contributor to the failure. This is an easy trap for the analyst because there is a cognitive tendency to stop searching after there is a major finding. However, that finding might not be the only explanation. An example from everyday life is when you are rushing out the door and can’t find your wallet. You search the various places and find it on your desk. You then rush out the door and go to your car only to find you don’t have your keys—there was more than one item to find. Like with the anchoring error, a helpful way to avoid the search satisfaction error is to keep asking the question, “Is there something more?” (Groopman, 2007a, pp. 169-70, 185)

## Causes of Cognitive Error

Cognitive errors are caused by faulty thinking influenced by a variety of factors. These factors may include inner thoughts or feelings that analysts typically don’t recognize as affecting their thinking. There can be negative feelings about the problem under study or the people involved in the problem. There can be a fascination with some part of the problem that diverts the analyst’s attention. There can be events and things in the environment that channel thinking in a particular direction, e.g., in medicine the literature has evidence that internists give less attention to and are less thorough with patients believed to have a psychological disorder. Urgency in completing analysis is another significant factor that can induce cognitive error. Haste in the analysis makes the analyst vulnerable to the whole range of cognitive errors and increases the likelihood of those errors (Groopman, 2007a, pp. 39-40, 88).



## Avoiding Cognitive Error

There is no single script or methodology to avoid cognitive error. The researcher and analyst must be on constant guard against these errors. There are a series of steps or check lists that you, as an analyst, can use to help guard against the errors.

First, consistently question your work:

Question the precision of your language: Are you accurately describing the data and your analysis?

Question your data collection: Should you collect additional data?

Question your analysis: What else could it be; how else can it be explained?

Even ask the question, “What is the least likely explanation?”

Second, slow down your observation of data and its analysis. This offers you an opportunity to exam the full range of data—not just data that support the hypotheses. It also affords you an opportunity to identify a wider range of factors that could influence the data. In other words, it is important to look beyond a narrow data set or the initial analysis, e.g., if you are trying to explain the failure of a flight system and focus only on failed electrical components as the causative factor, you might not see that the electrical problem could have been caused by nearby mechanical pressure on the electronics—or the electrical failure could have been caused by a temperature differential—or it could have been caused by radiation—or it could have been caused by a combination of those factors, or yet something else (Groopman, 2007a, p.182).

Third, generate a list of alternative explanations after you have generated a list of alternative explanations. In other words, do it more than once. You should do this even when you are convinced that you have strong supporting data and good analysis. The obvious explanation of the immediate event may not reveal the underlying cause. A medical example can best illustrate this point. If a patient complains of pain in the ankle, and the physician—with the benefit of a clinical exam and x-rays—concludes the cause is a sprained ankle, there may be more to the case. The physician could have ignored the contributing and more fundamental causes, such as the patient acquired the sprained ankle because of a fall that in turn was caused by anemia (or a transient ischemic attack, a TIA, or an irregular heart beat that reduced the blood flow to the brain) (Groopman, 2007a, p. 66).

COGNITIVE ERROR	EXPLANATION OF ERROR	QUESTIONS TO MINIMIZE ANALYTICAL RISK
Categorical Thinking Bias	Paying too much attention to categorical boundaries	How can I consider this fact or element of the case outside of its boundary?
		What is a broader category in which to place this fact or element of the case?
Rationality Assumption Error	Assuming a simplistic more rationale process	What other multivariate factors might influence the case and its processes?
		What random, unexpected factors might be playing a role in the processes of the case?
		What aspects of components in the system have you not considered?
Tribal-Moral Community Bias	Narrowing research focus as a result of being a member of a "community"	What is the perspective of your particular tribe or community?
		What are the "sacred values" of your tribe or community?
		How can you expand your research beyond your "tribe's" perspective and values?
Cognitive Dissonance Bias	More readily accepting data that is more consistent with your existing mind-set	How do the new data challenge my original mind set?
		How can I revise my initial assessment based on new, sometimes inconsistent, data?
Anchoring Errors	Latching onto a single possibility and failing to consider a range of possibilities	Are there any data that I have overlooked in identifying lessons?
		Are the lessons more complex and multivariate?
		Are there data that contradict the working hypothesis?
		Is there really a different lesson here?
Search Satisfaction Error	Stopping the research when you uncover a major finding	Is there something more to this case?
		What other explanations are there?

**Table 5: Questions to Minimize Analytical Risks From Cognitive Errors**

Cognitive errors typically operate below the level of conscious thinking, and it is important to consciously go through this kind of checklist. Attempting to correct potential errors helps the analyst think of an explanation that he or she didn't previously consider. Doing so will bring the errors closer to the surface of thinking and reduce the uncertainty of analysis. Table 5 is a guide dealing with cognitive errors. It lists the six cognitive errors I discussed in this section, explains the errors, and offers a series of questions that you can use to help minimize the risks associated with cognitive errors.

## Conclusion

*“A wealthy merchant bought many baskets of salt and tied them on his donkey . . . The donkey slipped beneath his heavy load and fell into the water. . . . [H]alf the salt . . . washed away. . . . The baskets were only half as heavy. . . . The merchant sold . . . the salt and bought several bags of sponges. . . . When they came to the river, the donkey . . . pretended to slip and rolled into the water, hoping his load would be lightened. But the sponges . . . soaked up water until they swelled fat and heavy. . . . The beast staggered home under a load secondary.”*

—From “*The Donkey and Load of Salt*,” Aesop’s Fables

Fundamental to the lessons-learned analytical process is identifying the lessons. Equally important, however, is knowing how and when to apply the lessons to ensure a particular outcome. In the fable, the donkey thought that he learned a useful lesson about how to reduce the weight of his load. He applied it with eagerness only to find that the lesson was not applicable to the new situation. In fact, when he applied the lesson, he made his situation worse.

Failing to correctly learn or apply lessons can be fatal not only for our donkey, but also for organizations. Kodak’s experience is one example. During the 20<sup>th</sup> century Kodak was the dominant provider of film to both the public (for its Brownie, Pentax, and other home cameras) and to the Intelligence Community (for NRO’s classified film-return satellite reconnaissance cameras like Corona and Hexagon). As the century came to a close there was a revolution in photography with the emergence of transformational digital technology, but Kodak’s organizational behavior hindered a fast response to this new technology that changed the process of capturing and sharing images. It was applying the wrong lessons. Lucas and Goh (2009) reported that as a result Kodak suffered an almost 80% decline in its workforce, lost market share, and suffered falling stock prices (Ehrenberg, 2012; Lucas & Goh, 2009; McDonald, 1995).

The Kodak example demonstrates a principle for all organizations, which by definition are open systems. If they are to survive, they must acquire what some would describe as negative entropy to counter the law of entropy. This is the law of nature that states all systems move toward disorganization or death. Biological organisms run down, disintegrate, and die; sociological organizations also have a natural tendency to become disorganized and dissipate themselves. To counter this, the open system must acquire more energy from its environment than it expends as part of its transformation process. Learning and incorporating lessons into the organizational system brings energy to the system. Unless the organization can continually import and store more energy than it expends (thereby acquiring negative entropy), it will disintegrate and fail in its organizational mission. Applying lessons-learned can bring this new energy into the system (Katz & Kahn, 1966, p. 21).

Each lessons-learned experience with its new energy is unique, often with unknown causes and embedded secondary lessons not readily apparent. The challenge is to collect data, do an analysis, and develop a series of hypotheses that could be lessons. The goal is to identify a contingency statement to serve as the lesson in the form of, “When the player(s) exercise a particular behavior, it increases the probability of a particular outcome.”

Identifying and applying lessons is an ongoing challenge for all individuals and organizations. The IC, as with most organizations, has a long record of both meeting its goals and falling short of its goals. And it is through learning from these experiences that an organization maintains and improves itself. Evidence in the literature supports the view that expertise is largely acquired through experience, but there also is evidence that receiving feedback through lessons helps individuals and organizations understand technical errors and misguided decisions. The challenge for individuals and organizations is to recognize when they meet their goals, and celebrate it. While at the same time, identify those experiences where they miss their goals, and admit it. In both cases, they should analyze the experiences with a view to learn lessons to sustain excellence and improve performance (Groopman, 2007a, postscript).

Identifying lessons and sharing them across the Intelligence Community has the potential to improve performance for the entire Community. Pfeffer and Salancik (1978, p. 74) have pointed out that when lessons are learned and shared within an organization, it focuses organizational energy, attention, and demand on the identified lessons so the organization can improve its capabilities. This kind of sharing lessons makes it more likely that those lessons will be learned and applied in future decision making. An aggressive lessons-learned program can give managers the tools to improve performance (Van De Ven & Ferry, 1980, p. 3).

I offer the methodology in this monograph as a social-science based approach to gain an understanding of ways to improve on organizational efficiency and output—ways that can identify lessons that offer insight on how to sustain and improve organizational performance. The methodology is applicable to a wide range of organizations, both within and outside the IC. The methodology incorporates the best insight from the case-study framework as a foundation for the integration of the general systems paradigm with congruence theory. It can offer insights to reinforce highly productive behaviors associated with satisfying performance, as well as offer insights to modify—in a positive direction—less productive behaviors associated with the more frustrating experiences.

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# Appendix A—Research Design Template (With Questions to Consider)

## Overview of Appendix A

This Appendix provides one example of a template for drafting a concise, but focused research design. While you can find a variety of examples for drafting a research design in the social science literature, this example, with its associated questions, should be helpful in ensuring that you address six areas that are critical to consider when you design your lessons-learned research: 1) statement of the research problem; 2) definition of terms/concepts; 3) scope and limitations of the research, including identification of your selected case study; 4) how you will apply a disciplined lessons-learned methodology to your case; 5) research schedule; and, 6) spend plan and needed resources. For each of these topics in the template you will find a series of questions to consider when you draft that section of the research design.

### **Research Design for [Insert Subject of Research]**

**Statement of the Problem** (This is the most important part of the research design. It defines the focus of the research and suggests the steps to find the results.)

- What is your main research question?
- What are the sub problems and associated research questions?
- What is your working hypothesis, if you have one?

**Definition of Terms** (This step makes explicit the concepts you will be addressing)

- What are the terms that have a special meaning for this research?
- How will you be defining those terms?

**Scope & Limitations of the Research** (This step bounds your research)

- How are you defining the case you will be studying?
- How will ethical, legal, security, and other limitations constrain the study?
- What kinds of constraints do time, geographical limitations, and resources present?
- What are the conceptual limits of the research?
- What is the form and scope of the final product (i.e., is the final product a written journal article, monograph, or book; is it an oral presentation of specific length; is it a multimedia production of a particular form and length)?

**Methodology** (This step explains how you will do your research)

- Will this be an exploratory study, descriptive study, comparative study, single case study, or have some other form?
- What is your strategy for data collection?
- What approach to data collection will you use (observational, interviews, surveys, documentary research)?
- To what extent, and how will you be using a historical method, quantitative analysis, qualitative analysis, general systems theory, congruence analysis, the experimental method, and other methodologies?

**Schedule** (This step explains the allocation of time for the research and identifies target dates for completion of the various parts of the research.)

- How long will this research project take?
- How much time will you be spending on each phase of the research project (e. g., data collection, analysis, writing, and reviews/revisions)?

**Resources** (This step identifies any needed resources for the research)

- What will it cost to conduct the research, and what is your source of funding?
- How will you allocate your funding resources?

**Attachments** (Through the use of attachments you have an opportunity to provide some detail about your research plan)

- Preliminary outline for the final product
- Tentative list of potential interview subjects
- List of potential sources for documentary research
- Preliminary list of the kinds of peer reviewers

# Appendix B—Data Collection Framework and Examples of Questions<sup>1</sup>

## Overview of Appendix B

This appendix outlines a general data collection framework with specific examples of the kinds of questions that might be helpful for a political science case study related to national security. For other kinds of case studies, you might want to develop a different set of questions. I have organized the questions according to the components of the lessons-learned systems model (See Figure 2 on page 14). There is a separate section in the framework for each of the four system components of the model (See Table 1 on page 12).

While the specific questions in this example might be most appropriate for studying national security organizations, the questions serve to illustrate the scope of data that should be collected in order to be able to describe and explain each component of the model. In developing your specific list of questions, you should ensure that: (a) your questions consider each component of the lessons-learned systems model, (b) they are relevant to your basic research question, and (c) the listing is comprehensive enough to enable you to adequately describe each system component. After data collection, you can use your list of questions as a checklist to ensure that you collected ample, relevant data for each component in the model. The answers to your data collection questions can then serve as the required input for writing your description of the case study.

## Section 1—Environment Components

### **SOCIETAL DOMAIN (THE HUMAN ECOLOGY)**

#### **Geopolitical**

1. What is the focus of U.S. National Security Policy during the period under study?
2. What geo-spatial factors are impacting U.S. national security?
3. What is the focus of U.S. National Intelligence Strategy?
4. What is the focus of U.S. military strategy?

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<sup>1</sup> References: Levinson, Molinari, & Spohn, 1972; Nadler & Tushman, 1989; Nordregio, 1999; Van De Ven & Ferry, 1980.

5. What are the major national security threats to the U.S.?
6. What are the major U.S. military operations?

## **Domestic Political**

1. What political party controls the Executive Branch, and what are the administration's philosophy and goals?
2. What political party controls the Legislative Branch, and what are Congress's philosophy and goals?
3. What role is the Judicial Branch playing, and what judicial philosophy does it exhibit?
4. What role is the press playing in matters related to the organization's mission?
5. What pressures and influences are the Administration, Congress, and the Press placing on the organization and its leadership?

## **Economic**

1. What is the strength of the economy (productivity, sectoral structure, future orientation, wealth, and labor market)?<sup>2</sup>
2. What is the economic growth rate?
3. What is the state of the Federal Budget (e.g., size, deficit, taxation, expenditure trend)?
4. What is the relative strength and direction of the Intelligence Community budget?<sup>3</sup>
5. What are the funding priorities for intelligence?
6. What is the relative distribution of funding in the Intelligence Community budget?

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<sup>2</sup> Productivity as GDP/employee; sectoral structure in terms of proportion in agriculture, industry, etc; future orientation in terms of proportion of research and development employment; wealth in terms of GDP per head; and labor market in terms of unemployment rate.

<sup>3</sup> Relative in comparison with other national security and budget sectors.

## **Other Societal Factors**

1. What other kinds of factors are part of the environment's societal domain for this case?
2. What are the impact and implications of these factors?

## **ASSOCIATIONAL AND RELATIONAL DOMAIN (THE EXTERNAL ALLIANCES AND ASSOCIATIONS— THE CUPS: CUSTOMERS, USERS, PROVIDERS, & STAKEHOLDERS)**

### **Dependencies**

1. What is the policy coordination dependency for the organization?
2. What is the technological dependency?
3. What is the fiscal dependency?
4. What is the supplier dependency?

### **Communications<sup>4</sup>**

1. How formal are communications with the CUPS?
2. What is the typical mode of communication?
3. What is the frequency of communication?
4. What is the quality and content of communication?

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<sup>4</sup> See the "Information Network" domain section for questions related to organization's internal information network.

## **LIMITATIVE AND RESTRICTIVE DOMAIN (THE STRUCTURAL AND BEHAVIORAL CONSTRAINTS)**

### **Legal & Regulatory Constraints**

1. Under what legal authority does the agency head and program manager direct the agency and project?
2. What regulatory regime controls how the agency head and program manager direct the agency and project?
3. What constraints do these laws and regulations impose on the agency head and program manager?

### **External Oversight**

1. What kinds of oversight are there from the Executive Branch (e.g., ODNI, USD/I, and OMB)?
2. What kinds of oversight are there from Congress?
3. What kinds of oversight are there from independent bodies (e.g., PFIAB, national commissions)?
4. What kind of attention is the press giving the organization and/or task?

### **Fiscal Constraints**

1. Who has fiscal authority to manage the funding for the project?
2. How much flexibility is there in the funding (e.g., what authorities does the program manager have to change to the specifics of the funding within the overall funding ceiling)?

### **Technical Constraints**

1. What are the technical constraints imposed by the limits of engineering and scientific knowledge?
2. What are the technical constraints that result from human performance limitations?

4. What are the technical constraints that result from policy and funding?
5. What are the limits and implications of the technical constraints?

### **Other Limitative Factors**

1. What other kinds of constraints are part of the case's limitative domain?
2. What are the limits and consequences of those constraints?

## **HISTORICAL DOMAIN (THE HISTORICAL CONTEXT)**

### **Societal**

1. What was the geopolitical history during the origin of the organization and at the time of task input?
2. What was the domestic political history?
3. What was the scientific and technological history?

### **Organizational**

1. What was the origin of the organization?
2. What is the organization's performance history?
3. What major crises did the organization experience?
4. What is the organizational folklore?

## Section 2—Input Components

### **THE REQUIREMENT (THE NEED THAT IS TO BE SATISFIED BY THE PROCESS)**

#### **Problem**

1. What is a specific, detailed explanation of the problem or problems to be addressed by the task given to or assumed by the organization?
2. What issue or issues are expected to be resolved by the task given to or assumed by the organization?

#### **Objective**

1. What is the deliverable that is expected to satisfy the need?
2. What is the desired end-state?
3. What is (are) the indicator(s) of success?

#### **Complexity**

1. How difficult is it to separate the different parts of the problem and/or deliverable(s)?
2. How many interest groups are stakeholders?
3. What are the conditions that could hinder reaching the objective?
4. What kind of constraints are associated with meeting the requirement?
5. What is the degree of uncertainty associated with satisfying the requirement?



**FUNDING FOR THE TASK**  
**(FISCAL RESOURCES DEDICATED TO SATISFYING THE REQUIREMENT)**

**Amount of Funding**

1. How much funding does the budget allocate to the activity under study?
2. Who has execution authority?

**Nature of Funding**

1. To what degree does the funding match the requirement?
2. Who has execution authority?

**STAFFING FOR THE TASK**  
**(HUMAN RESOURCES DEDICATED TO SATISFYING THE REQUIREMENT)**

**Level of Staffing**

1. How many government and contractor personnel are authorized for the project?
2. What is the vacancy rate for the authorized positions?

**Nature of Staffing**

1. What is the skill mix defined for the staffing?
2. What is the proportion of government and contractor personnel authorized for the project?

## Section 3—Process Components

### **FORMAL ORGANIZATION (THE FORMAL ARRANGEMENTS BETWEEN COMPONENTS OF THE ORGANIZATION)**

#### **Demographics of Organization**

1. What kind or type of organization is under study in the case?
2. What is the size of the organization?
3. What is the age of the organization, or how long did the organization exist?
4. What is the growth stage of the organization?

#### **Design of the Organization**

1. How is the organization structured (vertical, horizontal, etc.)?
2. What is the form of the sub-components (by function, program, matrix, location, etc.)?
3. What is the vertical differentiation (i.e., the number of supervisory levels)?
4. What is the horizontal differentiation (i.e., the number of subunits)?
5. What is the mix of government and contractor employees?
6. What is the distribution of authority?

#### **Administrative Intensity**

1. What is the supervisor to staff ratio?
2. What is the top manager's span of control (include non-supervisory personnel)?
3. How extensive is middle management?

## **Bureaucratic Constraints Within the Organization**

1. What are the organizational affiliations and allegiances?
2. What are the internal HR constraints?
3. What are the internal fiscal constraints?

## **Work of Organization**

1. What is the nature of the organization's work environment?
2. Where is the work done in relation to the organizational components?
3. What is the complexity of the work (i.e., number of different products/ services, territories of operation)?

## **INFORMAL ORGANIZATION (THE INFORMAL ARRANGEMENTS WITHIN AND EXTENDING BEYOND THE ORGANIZATION)**

### **Relationships**

1. What is the degree of awareness that the organizations' components have with each other?
2. What are the intramural relationships associated with this awareness?
3. To what extent are there informal extramural arrangements that extend beyond the formal structure of the organization?
4. What are these extramural relationships?
5. What is the intensity of the intramural and extramural informal relationships?
6. What is the impact of turnover rates on these informal relationships?

## **Culture**

1. What is the organizational ideology?
2. How is time regarded (e.g., value as an investable commodity; orientation to past, present, and future)?
3. What are the customs, taboos, and prohibitions?
4. What are the organizational symbols and slogans?

## **Influences**

1. What is the distribution of power (i.e., ability of “A” to get “B” to change)?
2. What are the influence patterns?
3. How much discretion do individuals have (i.e., the discretion individuals can exercise in making task-related decision)?
4. What is the organizations time span and rhythm (planning cycles, degree activities regulated by time)?

## **Dependencies**

1. What are the internal dependencies?
2. What are the external dependencies?

## **Certainty**

1. How much agreement is there on goals and priorities?
2. How much clarity is there in how to respond to events?

## **NETWORK OF INDIVIDUALS**

### **(THE ORGANIZATION'S COLLECTION OF INDIVIDUALS)**

#### **Demographics**

1. What is the gender ratio of the individuals?
2. What is the age range and typical age of the individuals?
3. What is the cultural composition of the individuals?

#### **Education**

1. What formal education do individuals have?
2. What informal education do individuals have?

#### **Skills**

1. What are the skills directly related to the task?
2. What are the skills associated with related tasks?

#### **Experience**

1. What is the typical tenure of individuals?
2. What experience do individuals have in the disciplines of national security (e.g., national reconnaissance, intelligence, and diplomacy)?
3. What experience do individuals have that is directly related to the task?
4. What experience do individuals have in related industrial sectors?

## **Style**

1. What behavioral and attitudinal preferences do the individuals have?
2. Are individuals task-oriented or relationship-oriented?
3. Are individuals introverts or extroverts?
4. What communication style do the individuals exhibit?
5. How do individuals resolve conflict?
6. What behavioral patterns do individuals exhibit?

## **Affect and Motivation**

1. What are the expectations of the individuals?
2. What are the needs of the individuals?
3. What rewards do the individuals seek?

## **INFORMATION NETWORK (THE ARRANGEMENTS WITHIN THE ORGANIZATION FOR COMMUNICATING INFORMATION)**

### **Formalization**

1. What is the degree to which rules govern information exchange between individuals within the organization?
2. What is the degree to which rules govern information exchange between groups?
3. To what degree is there centralized control of information sharing?
4. How spontaneous are the communications?

## **Mode**

1. What is the range of information sharing modes (i.e., face-to-face conversations, telephone, memos, email)?
2. What is the distribution of information sharing across the modes?
3. How do meetings compare with individual conversations as modes?
4. What kinds of internal employee publications (such as newsletters) are there?

## **Frequency**

1. What is the frequency of personal communications?
2. What is the frequency of group communications?
3. What is the frequency of organizational component communications?
4. What is the timing, rhythm, and urgency of communications?

## **Quality & Content**

1. How much communication is task-related?
2. How much communication is socially oriented?
3. How difficult is it to make contact with people?
4. How often do communications get lost?
5. How useful do individuals find communications?

**THE TASK**  
**(THE ORGANIZATION'S WORK ACTIVITY**  
**DIRECTED TOWARD SATISFYING THE REQUIREMENT)**

**Nature of Task**

1. What kind of task is involved?
2. How much time is required for the task?
3. What is the task variability (the number of exceptions encountered in the course of the work)?
4. What is the degree of uncertainty associated with the task?

**Difficulty of Task**

1. What is the analyzability of the task (i.e., the ease and clarity of knowing the nature and order of what needs to be done)?
2. What is the predictability of the task (i.e., the ease with which individuals can determine the outcome of a particular sequence in advance)?

**Expertise for Task**

1. What skills are required for the task?
2. What specialization does the task require?



## Section 4—Outcome Components

### **THE DELIVERABLE(S)** **(THE PRODUCT OF THE ORGANIZATION'S WORK—** **—WHAT THE PROCESS PRODUCED WHILE TRYING TO SATISFY THE REQUIREMENT)**

#### **Nature of the Deliverable**

1. What is the deliverable?
2. What kind of deliverable (e.g., hardware, software, information, intellectual property, an organization, a building, a system)?
3. What is the value of the deliverable?
4. What is the expected lifespan of the deliverable?

#### **Utility of the Deliverable**

1. What are the functions and capabilities of the deliverable?
2. How efficient is the deliverable?
3. What are the applications and uses for the deliverable?
4. How adaptable is the deliverable?

### **PROCESS CHANGE** **(HOW THE SYSTEM AND ITS ENVIRONMENT** **CHANGED DURING THE PROCESS)**

#### **Internal**

1. What are the changes that have taken place within the system?
2. What kinds of changes are these?
3. What is the scope of these changes?
4. How different is the system at the time of output compared with the time of input?
5. What is the likely impact of these changes?

## **External**

1. What are the changes that have taken place within the environment?
2. What kinds of changes are these?
3. What is the scope of these changes?
4. How different is the environment at the time of output compared with the time of input?
5. What is the likely impact of these changes?

# Appendix C—Interview Protocol

## Overview of Appendix C

This appendix offers a protocol for conducting social science research interviews. I organized the appendix into three annexes:

**Annex 1 – Types of Interviews.**

In this annex you will find a table that lists and explains the three types of interviews. In planning and conducting an interview, it is important to know the objective so you can research and structure your questions accordingly.

**Annex 2 – Checklist for Conducting Social Science Research Interviews.**

In this annex you will find a table that lists the various factors you need to consider as you prepare for and conduct the interview. For each factor you will find a checklist of the tasks you need to address as you deal with each factor.

The checklist in the table makes reference to three documents you should prepare as part of the interview process. You will find attached to this annex sample templates for these three documents.

**Attachment 1** – Sample Template for Pre-Interview “Introduction Letter”

**Attachment 2** – Sample Interview Consent Form

**Attachment 3** – Sample Template for Post Interview “Thank You Letter”

**Annex 3 – Questions to Consider and Avoid.**

In this annex you will find a table that lists the types of questions you should consider using in your interview and the types of question you generally should avoid using during your interview session.

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Annex 1 – Types of Interviews

INTERVIEW TYPE	EXPLANATION
Fact-Based Interview	
Objective	To document facts related to an event, activity, or experience—either at one point in time or over a period of time.
Examples	Oral history interview, investigative interview, medical history interview.
Special Considerations	Tend to be unstructured interviews and conversational. As the interviewee responds, be sure to ask the interviewee to specify dates and locations related to the events, activities, and experiences. When the interviewee names other players, get the full names (and spelling, especially if unusual) and enough information to understand the contextual relationship of the named players to your discussion.
Opinion-Based Interview	
Objective	To document the interviewee's opinion or opinions about a particular subject.
Examples	Seeking opinions on a topic or question, eliciting interpretations of policy.
Special Considerations	This should be a more structured interview with consistent administration across interviewees. The questions tend to be closed-ended.
Mixed Fact-Based Opinion Interview	
Objective	To document the facts about an experience and the lessons the interviewee believes he or she learned from that experience.
Examples	Lessons-learned interview
Special Considerations	Tend to be semi-structured interviews and conversational. If a lessons-learned interview, try to draw out lessons, rather than explanations of what happened. Attempt to defer discussions of the interviewee's assessment and explanations of what happened until the end of the interview. In general, question the interviewee about the facts associated with the experience in order to document the context for the opinions. Frame questions to solicit the interviewee's assessment and opinion about the topic under discussion. Seek to find out the interviewee's rationale that brought him or her to that assessment.

## Annex 2 – Checklist for Conducting Social Science Research Interviews

FACTORS	CHECKLIST ITEMS
BEFORE THE INTERVIEW	Prepare topical outline and questions.
	Vet questions with research team.
	Send “introduction letter” (signed by research director) to interviewee. See Attachment 1 to this annex for a suggested template. Enclose the topical outline (or if a “fact-documenting” interview, you may include the questions. Withhold questions if an “opinion-based” interview).
ENVIRONMENT	Schedule a time when there will be no interruptions.
	Select a room with comfortable temperature and humidity.
	Be sure the room is quiet.
	Exclude any observers (unless you are interviewing a person who wishes to have his or her executive assistant or legal adviser present, or when it might be necessary to have a security officer present).
INTERVIEW TEAM	Whenever possible, there should be a team of two conducting the interview, an “interviewer” and a “recorder” or “scribe.”
	The “interviewer” should be the exclusive questioner (except for those cases where a discussion-type interview format might be more appropriate. You should clear the use of this format with the research manager or project director).
	The “recorder/scribe” should take notes on key points and document relevant body language and other contextual elements.
	The interviewing team members should avoid interjecting their own opinions about the subject under study.
	The team composition should avoid members who might “influence” or “intimidate” the interviewee (e.g., a uniformed high-ranking military officer interviewing junior enlisted personnel, or a foreign national participating on the interview team).
DURING THE INTERVIEW	First, be sure the interviewee signs an interview agreement form, such as the example in Attachment 2 to obtain informed consent.
	Review the ground rules (summarize key points in the interview agreement form, and state the role of others who might be present).
	Always record the interview, preferably with a digital recorder.
	Have the interviewee specify dates, names, and places; explain jargon; and, give context. Follow-up with probing questions, as appropriate.
	After turning on the recorder, start with an introductory statement like:  “I am recording an interview with [interviewee], [position & affiliation]. I am [interviewer], and today is [date]. We are conducting this interview in [city/state, building/room]. The classification level will be up to [indicate].” [If others are in the room ask them to state their name and affiliation].
AFTER THE INTERVIEW	Send a written thank you; invite follow-up information.
	Transcribe, correct/edit, and document the interview.

Annex 2 (Checklist)

Attachment 1—Sample Template for Pre-Interview “Introduction Letter”

[Insert DATE]

[Insert NAME]  
[Insert ADDRESS 1]  
[Insert ADDRESS 2]  
[Insert ADDRESS 3]

Dear [Insert NAME]:

I request an opportunity to interview you in support of a current research project that is under the overall direction of [Insert the name of the overall director]. The subject of the research project is [Insert a phrase that describes subject under research].

Mr./Ms./Dr. [Name and position title of project manager], is the project manager for this research activity. Mr./Ms./Dr. [Interviewer] is one of the interviewers and is the research interviewer whom we identified to interview you. Mr./Ms./Dr. [Interviewer] [Insert something about the interviewer to introduce him or her, e.g. credentials, experience, etc].

Our research is focusing on [Insert an explanation of the scope and purpose of the research]. We are interested in hearing your views about [Insert what it is we want from the interviewee]. As the [Insert interviewee’s relationship with the matter under study], you are in a unique position to comment on [Insert whatever it is]. We are seeking an open and frank discussion of your personal opinions on the matters under our study. For your background, I have enclosed a list of topics that [Interviewer] plans to discuss with you.

[Interviewer] will record the interview. Resources permitting, we will transcribe it over the next several weeks. Should we be able to do that, we plan to provide you with the initial draft transcript for your review and editing. We will then correct or revise the draft transcript and use the corrected transcript as one of our sources to research and write about [Insert whatever it is]. At the end of this research project, we will maintain a copy of the draft transcript for follow-up research in [State where].

We will conduct this interview at the [Insert classification] level. (If classified, state that the interview will take place at a secure facility, and indicate where that will be.)

As part of our research protocol [Interviewer] will request your consent for us to interview you and ask you to sign our standard interview consent form, which also explains how we handle the interview information we collect. I have enclosed a copy of that form for your advanced reading.

We will contact you within the next [Insert number of days] days to discuss your availability for the interview and any relevant security constraints. Should you have any questions in the interim, feel free to contact either [Interviewer] or me [Insert phone number and/or e-mail address].

Sincerely,

Enclosures:  
Potential Topics List  
Interview Agreement

## Attachment 2 — Sample Interview Consent Form

*Interviewee:* \_\_\_\_\_ *Interviewer:* \_\_\_\_\_

*Location:* \_\_\_\_\_ *Date:* \_\_\_\_\_

2. **Nature of Interview.** I understand: (a) the interview is part of [Insert name of organization conducting the research]'s ongoing consultative and deliberative process of documenting historical experiences and assessing lessons learned from those experiences, and (b) the [Insert name of organization conducting the research] is seeking open and frank discussion of my personal opinions on the matters to be addressed.

4. **Record of the Interview.** I understand that the written transcript, and any associated recording, may be accessioned into the [Insert name of organization conducting/sponsoring the research] reference collection after an accuracy check by the interviewee, as resources, time and opportunity permit.

a. The [Insert the name of the organization conducting/sponsoring the research] treats all recordings and/or interviewer notes as draft, raw research data and considers any content that reflects your personal opinions, interpretations, and advice to the [Insert title of the senior director of the research organization] to be “draft and pre-decisional deliberative.” These raw research data typically will be segregated from other research data and retained in a controlled environment.

b. Access to such draft, pre-decisional research data is controlled by the [Insert title of the senior director of the research organization], and that access limited to those with a validated research requirement. Researchers may use records of the interview as primary source research material only when authorized by the [Insert title of the senior director of the research organization] (or designated representative).

c. The [Insert title of the senior director of the research organization] clears finished research products prior to publication, and will attempt to honor any restrictions the interviewee might request to be placed on interview materials, in the event the interviewee makes such a request.

d. (Include a paragraph along these lines only if the research sponsor is a Federal Government organization.) Records about me that are collected through my participation in this research activity are covered by [Insert an explanation of the authority for collecting the privacy data, i. e., identify the system of records notice published in the Federal Register, explaining where the notice is available, and provide the subject with a "Privacy Act Statement" that includes information about the notice.]

5. **Release of Interview Record.** (Include this paragraph only when a freedom of information (FOIA) law might be applicable to the sponsoring organization) Should any record of an interview be deemed responsive to a FOIA request, it would be reviewed in accordance with [Insert name of the relevant governmental agency's] review and release policy and any drafts that are pre-decisional/ deliberative personal opinions would be redacted or denied in full based on the applicable FOIA exemption. However, it could be possible that some cleared and published material that is responsive to a FOIA request after relevant redactions, may be released to the public contrary to the wishes of the interviewee.

6. **Classified Information.** (Include this paragraph only if national security classified information is involved and the interview subject has a pre-publication review requirement.) I understand that any classified information that I might discuss during the interview must be controlled and protected according to the security policy for that information.

a. I acknowledge that I am not authorized to publish any information related to this interview without first obtaining the written approval of the [Insert the name of the relevant government organization] prepublication review authority.

b. Prior to publication, or making arrangements for publication, of the interview records(s) or any work that I create that includes all, or any portion(s), or the record(s) of the interview, I agree to obtain pre-publication approval from the [Insert the name of the relevant government organization], or its successor organization, and to publish only when such approval is granted.

7. **Access to Interview Material.** Consistent with any dissemination controls levied by the [Insert the name of the relevant parent organization], I understand that I—or my executors, administrators, heirs, and assigns—may be given access to records of this interview to review or to use for research and publication purposes.

8. **Use of Interview Material.** As the subject of this interview, I grant, as qualified by any conditions I might append to this agreement, permission for the [Insert the name of the organization conducting/sponsoring the research] to use, duplicate, reproduce, and distribute my name and any photographs, artwork, videotapes, electronic representations or sound recordings associated with this interview, on an ongoing and cost-free basis for: scholarly research, documenting history and lessons-learned, and purposes such as promotional, news and public relations, or other comparable uses in print or electronic media.



9. **Gratuitous Service.** I also understand that my participation shall be considered gratuitous in nature, and the performance of services under this agreement is without remuneration. The [Insert the name of the organization conducting/sponsoring the research] shall not be liable to the interviewee for any expenses paid or incurred by the interviewee in connection with this interview (Include the following phrase when the parent organization will be reimbursing the subject for travel expenses), except for when the [Insert the title of the senior director of the research organization] has approved the reimbursement of travel expenses in writing in advance of the expenditure.

_____	_____
(Interviewee)	(Date)
_____	_____
(Interviewer)	(Date)
_____	_____
(Accepted on behalf of the <u>[Research organization]</u> )	(Date)

Annex 2 (Checklist)

Attachment 3—Sample Template for Post Interview “Thank you Letter”

[Insert DATE]

[Insert NAME OF INTERVIEWEE]  
[Insert ADDRESS 1]  
[Insert ADDRESS 2]

Dear [Insert NAME],

Thank you for participating in an interview for [Name of research project].

As our interviewer explained prior to the interview, we will be holding the interview material for further review as part of our deliberative research process. Our post-interview process is:

- Mark interview materials with the designation, “Draft Pre-decisional Deliberative” along with any required provisional classification markings;
- As time, funding and priorities permit, transcribe the recorded interview and make a copy of the draft transcript available to you for review and clarification;
- When time, funding and priorities permit, we will fact check the historical content of the draft transcript;
- Accession of the pre-decisional/deliberative recording and transcript into [Identify where you will be holding this draft, primary source material].

We recognize that the responses you provided during the interview are what you recall as facts; accordingly, we typically defer release or publication of a finished product until we can evaluate your information during our research and editorial deliberative review processes. We want to avoid the premature disclosure of preliminary assessments or proposed advice, and we want to protect against confusion that might result from the publication and release of information that, in fact, is not the ultimate grounds for assessments based on the insight we learn from our interviews.

Thank you, again, for joining us to participate in this history/lessons-learned research project, and providing us with your open and frank discussion. It is the insight we gain from these kinds of interviews that are one of the foundations of our research.

Sincerely,

## Annex 3 –Questions to Consider and Avoid

QUESTIONS	DEFINITION	EXAMPLES
<b>Helpful</b>	<b><i>Consider using these kinds of questions</i></b>	
Descriptive	A question that elicits a narrative description. These questions would include those that elicit information about broad experiences, a description of a specific experience, an example of an experience, or an anecdotal story.	Tell me about a typical day at the ground station. Tell me about the morning staff meeting. Share an example of when the committee cannot agree on the tasking requirement. Tell me the story of your experience during the launch.
Structural	A question that seeks an answer that provides structure to a particular phenomenon. These questions would include those that seek answers that are related to sequence's rationale, spatial relationships, causes, attributions.	Tell me about the steps you go through to plan a mission. What were the reasons for cancelling the program? At what places do you conduct the engineering tests? What were the causes of the failed launch? Describe the experience necessary to design the system.
Comparative	A question that seeks an answer that compares two entities. These questions would include those that seek contrasts and similarities.	What are the differences between the East Coast and West Coast operations? Describe the common themes in the requirements from the two agencies.
<b>Problematic</b>	<b><i>Generally avoid these kinds of questions</i></b>	
Binary	A question that elicits a "yes" or "no" answer.	Were there any managers who disagreed with the proposal?
Leading	A question with assumptions that could influence the answer.	How often did you violate the rules? (Assumes the interviewee violated the rules). When are you shutting down the program? (Assumes the interviewee will be shutting down the program).
Emotional	A question with emotionally-laden words.	What was it like working for a loud-mouth boss?
Compound	A question that is actually more than one question.	Describe the various players, and explain the functions they performed.
Jargon-heavy	A question that uses technical terms and acronyms.	How did cognitive dissonance impact on the decision for the radsint program at JMARC?
Vague	A broad question where it is not clear what the interviewer is looking for.	What is in the future?
Double Negative	A question that uses two forms of negation.	Tell me about a program where you did not receive insufficient funding?

# Appendix D—Memory: The Uncertainty of Recalling the Past—An Commentary on the Phenomena of Perceiving, Forgetting, and Fabricating

Robert A. McDonald

*“It’s a poor sort of memory that only works backwards”*

Spoken by the White Queen in *Through the Looking Glass*<sup>1</sup>

Most people assume that their memory is reliable, and it is an accurate record of their looking back at past events and experiences. In fact, memory is unreliable and faulty. It not only looks backward, but it also exists in the present and looks forward.

Recollections of past events are a prime source of data for historical and social science research. Yet there is strong evidence in the social science literature that reports based on memory are subject to biases and errors, and any memory-based reports might prove to be the least reliable for documenting past experiences and events. The kind of memory that we use to recall events or episodes from our personal experiences is labeled, episodic memory, as compared with semantic memory. Semantic memory refers to memory about facts in the world, e.g., the name of the President, the capital of a state, a math formula, while episodic memory is the source of recollections of our past experiences, and, therefore the information drawn out during oral history and other social science research interviews.<sup>2</sup> (Means & Loftus, 1991, p. 297; Corballis, 2013, p. 63).

It is not only social scientists who have concluded that memory becomes a challenge to the objective of learning realities from the past. Those who teach writing of autobiographical narratives acknowledge that memory is faulty, and recognize that this defect is a key challenge in writing memoirs and related accounts that are drawn from memory. In creating, or perhaps we might say “fabricating” the story from memory, some explain that this fabrication in the writing of memoirs is neither lying nor the creation of fiction, but merely the experience of challenging the limits of our memory. Regrettably, the challenge to the reader (especially one who is a social scientist trying to validate the authenticity of the narrative) is to determine when the limits of reality in the story have been exceeded (Roorbach & Keckler, 2008, p.28).

Unfortunately, most of us generally believe that our memories preserve precise accounts of what we perceived and experienced. At the same time, we are unaware of the errors in our

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1 Chapter V, “Wool and Water”

2 Episodic memory appears to be centered in the hippocampus part of the brain. In one case a patient, Clive Wearing, suffered damage to the hippocampus as a result of a viral infection. That deprived him of episodic memory and recollections of his past life experiences, although his semantic memory appeared to remain intact, e. g., he could still play the piano (Corballis, 2013, p. 63).

memory—we simply do not know how much of our past experiences we have forgotten. As a result, we assume that our memory is reliable and accurate, and we believe that the representations of the past that are stored in our memory are experiences we can recall with great detail and precision—and we believe the recalled experiences accurately can reproduce the reality of the past episodes. Unfortunately, the reality that we construct in our memory is unreliable and faulty. What we perceive as our experience is imprecise; what we retain as memory is scanty; what we remember can become distorted by conflicting information; what we recall from our memory often is based on inference. For the following discussion I have organized some of the more significant error sources into three broad general categories: input error, contamination error, and recall error (Chabris & Simons, 2009, p. 62; Corballis, 2013, p. 60).

## Input Error

For there to be any memory, there first needs to be the input of information. The environment, however, presents the senses with much more information than is required for decision making or action, and more than can be retained. After perceiving the broad spectrum of information in the environment, the brain selects and retains only those data that seem to be important and discards the data that appear to be uninteresting or irrelevant. In other words the brain only retains information that is necessary to respond to environmental stimuli, essentially ignoring and forgetting the rest. This process introduces errors during the input of information (Aamodet & Wang, 2008, pp. 2-4, 151; Corballis, 2013, p. 60).

These input errors that are introduced while experiencing an event and perceiving information in the particular scene associated with that event are varied and can include such factors as inattentional blindness, unconscious cognitive bias, and pattern fabrication.

**Inattentional Blindness.** One of the most fundamental input errors is inattentional blindness. This results when there is a lack of attention to the unexpected. Simons and Chabris (1999, pp 1059) conducted what has become a classic study where the subjects watched a video of two teams moving around and passing basketballs. The experimenters asked the subjects to watch the video and count the number of passes made by the players wearing white and to ignore any passes made by the players wearing black. Halfway through the video, a young woman wearing a full-body gorilla suit walked across the scene stopping in the middle and thumped her chest, then exited the scene. When the experimenters questioned the subjects after watching the video, about half of them did not see the gorilla. The study demonstrated that when individuals attend to a particular aspect of a scene, they tend not to see something that is unexpected, even when they are looking directly at it, and it is something most prominent (Chabris & Simons, 2009, p.6-7; Simons and Chabris, 1999, pp1059).

There are real-world instances that can be explained by inattentional blindness. Two examples: In 2006 Martha Fleishman, who had a perfect driving record, was driving her Chrysler New Yorker on Second Ave in Pittsburg. While turning left she hit a Suzuki motorcycle that professional football player Ben Roethlisberger was riding. Even though the motorcycle was in front of Fleishmen, she did not see Roethlisberger, and drove directly into

him. In 1977 KLM flight 4805 began its take-off role down the runway and collided at full speed with Pan Am flight 1736 taxiing down the same runway in the opposite direction. This is another case of an individual not seeing what the actor was looking at. In both cases, what those involved hit was unexpected and “unseen,” even though it was in front of the actors. This inattentional blindness places into question the reliability of recall elicited during research interviews (Chabris & Simons, 2009, p.6-7, 14, 20; Simons and Chabris, 1999, pp 1059).

**Unconscious Cognitive Bias.** Another fundamental input error is unconscious cognitive bias. Individual beliefs and attitudes are shaped by automatic and unconscious cognitive processes, where we store and retrieve information that is influenced by unconscious cognitive processes. Without deliberate thought and awareness, we interpret people, behavior, and situations oftentimes inaccurately, and then store the information as recollections of the episode. There is a growing body of research across a variety of disciplines, including social work, public health, law, and medicine that supports this view. For example, Haider, et. al., (2011) found that in a survey<sup>3</sup> of medical students at Johns Hopkins School of Medicine about 70% to 85 % of the students had an implicit preference toward those in the upper social class. The implicit bias recorded in the survey was significantly different from the students’ stated preferences (Teal, Gill, et. al., 2012).

Unconscious biases are ingrained in our cognitive processes where we use social categories to acquire, process, and recall information about our environment. This unconscious stereotyping helps us organize complex information. These processes permit us to use social categorization to reduce what can be a complex social world into manageable chunks of information. The stereotyping fills gaps in meaning, especially when the implications of the episode are unclear or ambiguous. When there is a heavy cognitive load, such as when we are under time pressure or suffering from fatigue, the cognitive processing relies more heavily on stereotyping to process incoming information from the environment. This cognitive bias is outside our consciousness, but the meaning assigned to the experience appears to us to be objective, rational, and justified. This process calls into question the quality of information that is being perceived and stored in memory (Haider, et. al., 2011; Hart and Jaccard, 2008; Teal, et. al., 2012; van Ryn and Saha, 2011).

**Pattern Fabrication.** Because we tend to rely on pattern perception to recognize patterns that give us insight, we may inaccurately interpret a series of random indicators as meaningful patterns even when no meaningful pattern exists. On the one hand, experts are trained to look for patterns that fit their expectations, and this can be helpful. Physicians look for patterns that are helpful in matching symptoms to specific diseases; military commanders look for patterns that are helpful in the tactical deployment of forces; teachers look for patterns that are helpful in developing teaching methods. On the other hand, the expectations of individuals, including experts, can lead individuals to see patterns that do not exist. (Chabris & Simons, 2009, p. 154-159)

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3 The Implicit Association Test (IAT) is a survey instrument that assesses a range of biases that include factors such as age, religious affiliation, ethnicity, immigrant status, race, obesity, sexual orientation (Teal, et. al., 2012, p. 83).

Redelmeier and Tversky (1966) reported on experiments that support this view. In one experiment the experimenters showed subjects pairs of numbers, one set purported to be indicators of patients' pain level on a particular day and the other purported to be the barometric pressure for that day. Up to 87% of the subjects saw a positive relationship, yet the data were fake. Much of what is stored in memory actually can be distorted assessments that match our conception of what we believe we saw rather than the reality. Our understanding, and therefore our memory of a particular episode, can be of the recollection of a pattern that actually is a biased fabrication rather than an awareness of the randomness of the actual events that occurred (Chabris & Simons, 2009, p. 154-159; Redelmeier and Tversky, 1966).

## Contamination Errors

Information acquired during an episodic experience is stored as chunks of data in our memory. These chunks of data can become contaminated after the initial experience while they are stored in memory. The contamination errors that are introduced after data are stored in memory can come from a number of sources and can include such factors as the override from new information, source memory failure, melding of similar events, and creation of false memories (Aamodet & Wang, 2008, pp. 151).

**Override from New Information.** The exposure of new information after an experience or event can modify the information held in the memory. Loftus (1996) reported on a study where subjects were shown a video recording of eight student demonstrators. As part of a post-viewing questionnaire, Loftus gave one half of the subjects false information that there were twelve demonstrators, and gave the other half of the subjects false information that there were four demonstrators. One week later Loftus asked the subjects how many demonstrators they saw. Loftus found that, in general, the false information influenced the subjects' answers to the question about the quantitative fact. The average response by the first group was 8.50, and the second group was 6.67 (Loftus, 1975, p 566).

**Source Memory Failure.** Failure of source memory is when we are unable to accurately have knowledge about how we came to have the memory. We can forget the source of a memory and even may appropriate another person's story, mistakenly attributing someone else's encounters with our own experiences. Source memory failures can be quite common and easily can be demonstrated. Wade, Garry, et. al. (2002) presented subjects with altered photographs showing each subject as a child enjoying a hot air balloon ride; even though the subjects never had taken hot air balloon rides. During recall some of the subjects incorporated information from the photograph into memories of their personal experiences; 50 % of the subjected created a false memory of experiencing a balloon ride—some even embellishing the recollection beyond what they had seen in the photographs (Chabris & Simons, 2009, p. 63-64).

**Melding of Similar Events.** There is a tendency for us to meld together similar events in our memory and create a variation of the actual experience. Press reports are replete with reports of politicians and celebrities who reported what turned out to be false information. In 2008 Hillary Rodham Clinton, when Secretary of State, claimed to have been under sniper

fire in Bosnia in 1996, but press reports and photographs from that time showed that not to be the case. In 2012, former Massachusetts Governor Mitt Romney recounted a story about witnessing an automobile jubilee celebration in Detroit, but he hadn't been born at the time of the celebration. In 2015 Brian Williams, while NBC News anchor, told a story he had been telling for years about an attack against a helicopter he was in over Iraq some twelve years earlier, but he retracted the story when crew members told *Stars and Stripes* that the attack never happened (*The Boston Globe*, 2012; Flint, 2015; Linton, 1986; Means & Loftus, 1991, p. 298; *The Washington Post*, 2008).

**Creation of False Memories.** Hyman and Pentland (1996) reported that research supports the premise that individuals can create false memories of complete, emotional, and self-involving events. Eyewitness memory research has reported that memory is reconstructive. Because memory is a constructive process, it combines the content of self-knowledge with external suggestions. Therefore, a recollection may be the combined product of information stored in our memory combined with suggestions from external sources. Hyman and Pentland (1996) conducted a study where participants who were unable to recall an event were asked to form a mental image of the event. They then were more likely to “recover a memory,” but a memory that created a false event. Braun, K. A., Ellis, R., & Loftus, E. F. (2002) reported on an experiment where exposure to an autobiographical advertisement altered the subject's recollection of a past childhood experience and even created a memory of an experience that never happened. The subjects viewed a Disney ad that suggested that they shook hands with a non-Disney character (e.g., Bugs Bunny). Exposure to the ad increased the subjects' belief that they personally shook hands with the character, which in this case was an impossible character. The suggested autobiographical referencing in this case lead to the creation of distorted or a false memory (Hyman & Pentland, 1996, p 111).

## Recall Errors

When the data chunks stored in memory are recalled, the recollection process can introduce additional errors. The recall errors that are introduced during the recall process are influenced by a number of causes and can include such factors as temporal changes, age-related deficits, re-creation distortions, and re-remembering modifications.

**Temporal Changes.** The length of time between an experience and the recollection of that experience is a crucial interval, and the length of that interval, and the events that take place during that interval affect the content of the recall. The findings in the social science literature generally agree that memory is less complete and less accurate after a longer retention interval than a short one. More of the data in our memory appears to be lost or unrecoverable the longer the interval (Loftus, 1996, p. 53).

The literature does not offer good explanations as to why some episodes in our past experiences are retained in memory and why others do not. Sigmund Freud (1938) offered the hypothesis that we repress memories of trauma; however, more recent research fails to support this. It now appears that memories of emotional experiences are more strongly retained



than other experiences that are more mundane<sup>4</sup>. From an evolutionary perspective, this makes more sense because those events related to survival more often have an emotional component (Corballis, 2013, p. 60-61).

The accuracy of these emotionally-related memories may be questionable. During recall the brain invents the details to fill the gaps in order to create a more coherent story. The left side of the brain seems to seek logic and order. This is so intense that when something doesn't make sense, the brain will invent a plausible explanation (Aamodet & Wang, 2008, pp. 2-4. 151).

**Age-related Deficits.** The length of time between perception and recall also is related to the aging of the individual making the recall. While aspects of cognition that are based on accumulated knowledge and experience actually may improve with age, memory—along with other cognitive functions such as attention, processing speed, and the ability to switch between tasks—declines over time with age. That results in errors of omission in the remembrance that ultimately is recalled, and puts into question the reliability of those memories that are from episodes that occurred at a younger age (Chabris, C. & Simons, D., 2009 p. 26).

**Re-creation Distortions.** The length of time the memory is stored and the aging of the individual recalling the memory interact with each other during the re-creation process to generate distortions in the accuracy and completeness of the recollection. We not only see what we expect to see, but we also remember what we expect to remember by making sense of the memory during recall. Brewer & Treyens (1981) conducted an experiment where they asked the subjects to wait in a graduate student's office for a short while before having them move to another room where they asked them to write down what they saw in the office. Almost all the subjects listed desk chairs, shelves—items that were in that office and most other typical graduate student offices. About 30% of the subjects recalled seeing books, and about 10% recalled seeing file cabinets—both of which were not in the office. During recall, the memory reconstructed objects in the room based on both what actually was there, as well as what the subjects expected should be there. What we recall is not a replica of reality, but rather a recreation of what we expect that reality to be (Chabris & Simons, 2009, pp.48-49).

**Re-remembering Modifications.** The experience of recall and re-remembering also can modify the facts in the memory. During a series of recalls, there appears to be variability in the content of information that is recalled. In one case from World War I, a soldier's succession of accounts written between 1914 and the 1970s changed significantly over the years. One explanation could be that the remembering of certain kinds of experiences, especially highly emotional-experienced events, such as war time experiences, can be part of an individual's search for ways to deal with the feelings experienced during the initial events; it therefore becomes necessary to modify the story in the memory to more easily deal with the feelings. As the individual recalls the experience to resolve emotional conflicts, the result is a blurring

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<sup>4</sup> An interesting observation is that in cases of amnesia. It is the episodic memories that more severely are affected, while the semantic memories may be undamaged. Episodic memories generally also are more intensely affected by Alzheimer's disease. Does this suggest that episodic memories are more fragile, and, therefore, at much greater risk of being lost or distorted? (Corballis, 2013, p. 63-64)

of distinctions between ‘fact and fiction,’ and ‘real and imaginary’ (Dawson, 1994; Roper; 2000, p 181).

When the *Challenger* exploded on 28 January 1986, Neisser and Harsch (1992) used it as an opportunity to demonstrate recall errors. They asked the students in their class at Emory University to write a description of how they learned of the explosion and to answer a series of questions about the accident. This immediate documentation of the details should provide an accurate baseline description of the event. Two and a half years later Neisser and Harsch asked the same students to complete another detailed questionnaire. The memories that the former students reported at this time were dramatically different from the details initially reported. They incorporated “facts” into their responses that were plausible, but never actually happened. In these later responses some former students remembered hearing about the accident from different people, at a different time, and in a different situation (Chabris & Simons, 2009, p77; Neisser and Harsch 1992).

A classic real-world example of the variability in recall is in the recollections of British World War I soldier, Colonel Thomas Edward Lawrence (T.E. Lawrence, known as “Lawrence of Arabia”), who dramatically led Arab forces across the desert to numerous battlefield successes. The Turkish army captured him in Deraa and subjected him to torture. In at least three different autobiographical accounts of this particular emotionally-laid episode in his life, Lawrence recalled three different narratives (Anderson, 2013, p 400-401; Lawrence, 1991).

Lawrence, with the accounts of his various exploits, has become an iconic figure, and biographers and historians highjacked his story to make it their own. This has resulted in ever changing, and sometimes mythical and conflicting accounts of his exploits with the Arabs against the Turkish military. As a result, he has become a legendary and enigmatic figure in the history of World War I. He has become a twentieth century icon who is seen to have led an Arab army in pivotal encounters against the Turkish military. He has become a hero who contributed to ending World War I and influencing the creation of what would become a complex Middle East, the Middle East that would have to be dealt with over the next century and beyond (Anderson, 2013, p 2; Dawson, 1994; Lawrence, 1991).

## Conclusion

From the above discussion it is clear that the evidence in the psychological and medical literature strongly supports the view that memory is highly unreliable. Nevertheless, there continues to be an illusion that through careful elicitation and recall, we can tap an accurate record of the past that resides in our mind. At the same time, most of us generally have a high degree of confidence in both our and other’s memory. In one survey 47% of the respondents believed that memory does not change, and 63% of the respondents believed that memory accurately records events experienced or observed in an episode for accurate recall and review in the future. The reality is that we are unaware of what we have forgotten because that information is lost. We cannot separate those aspects of our memory that are an accurate reflection of the past from those aspects that are based on new information that we may have

acquired, and subsequently altered. The altered information is the only information about the past episode that is in our memory (Chabris & Simons, 2009, p. 63).

Despite the strong evidence that memory is flawed, there is a range of common practices—conducting police investigations, taking medical histories, conducting oral history interviews—that continue to rely on individual memories as reliable sources of information gathering. The record of evidence, argues for a reality that is to the contrary. All the disciplines that elicit information from memory must be very cautious in how they use the data acquired from individuals' memories, i.e., data acquired from research interviews where the subjects describe events as recalled in their episodic memories. These data are not facts, but stories. Tobias Wolff (1989), a memoir author, explained early in one book that his memoir was a story from his memory, and in writing it he did his best to tell a truthful story from that memory, but he pointed out that memory does not always tell a truthful story because “memory has its own story to tell.” At best memory is a vague impression or explanation of the past; at its worst it is a distorted description of a past experience or observation. In all cases it is a questionable source for social science and historical research.

*“I have been through some terrible things in my life, some of which actually happened.”*

Author Unknown<sup>5</sup>

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5 This quote often is attributed to Mark Twain, but Fred Shapiro, the editor of *The Yale Book of Quotations* (Yale University Press, 2006) has concluded that the statement cannot be verified as having been written by Mark Twain. Nevertheless, the quote sums up the reality of memory, its ambiguous source citation is an example of the difficulty in documenting episodes from the past.

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# Appendix E—Outline and Checklist Questions for Case Description

## Overview of Appendix E

This appendix provides an outline with a checklist of questions for you to use in writing the case description. I based the outline on the various components of the general systems paradigm. By using this outline and checklist you will be sure to consider all the components of the system as you write the case description.

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## OUTLINE WITH CHECKLIST QUESTIONS

### **Abstract**

(Draft a short one- or two-paragraph abstract to serve as a high-level summary.)

### **Executive Summary**

(Draft a two- to three-page summary that describes the essence of the organizational system and the case.)

### **Introduction**

(Draft a brief discussion to introduce and define the organization, the systems with which it is associated, and the issue that prompted the preparation of a lessons-learned case study.)

### **Main Report**

(Draft a descriptive discussion of each of the four components of the system, and organize the report into four sections, one for each component. Describe each component by discussing its subcomponents and associated features. Use the questions listed under each feature as a checklist of points to cover. Not all of subcomponents and features may be relevant to your case, but answering the checklist questions should help you determine which features you need to discuss.)

## Section 1—Environmental Components

(Describe the environmental context in which the organization exists.)

### 1. Societal Domain

(Describe the “human ecology”)

#### a) Geopolitics

1. To what degree do geographical factors such as the Earth’s landscapes, peoples, places, and environments influence the case?
2. To what degree is the spatial allocation of territory, the distribution of natural resources, and the distribution of populations relevant to the case?
3. What national security threats impact on the case?
4. What foreign policy constraints are relevant?

#### b) Domestic Politics

1. To what degree does the national election cycle have an impact on the case?
2. How do the dynamics of Congressional politics affect the case?
3. How do the dynamics between the Congress and the Executive affect the case?
4. What political scandals might impact the case?

#### c) Economics

1. How do the domestic economic conditions (e.g., unemployment, inflation, economic growth) affect the case?
2. What is the impact of monetary policy on the case?
3. What is the impact of tax policy on the case?

#### d) Other Societal Factors

1. How does population migration affect the case?
2. How does the changing age distribution of the population affect the case?
3. How do factors such as crime and domestic terrorism affect the case?
4. How do the changing dynamics of the family affect the case?
5. What other societal factors are relevant to the case?

## **2. Associational and Relational Domain**

(Describe the external alliances and associations with suppliers, users, and stakeholders)

### **a) Dependencies**

1. What external organizations are the sources for input?
2. What external organizations depend on the organization's output?

### **b) Communications<sup>5</sup>**

1. What are the key external sources of communications input for the organization?
2. What external organizations depend on communications output from the organization?

## **3. Limitative and Restrictive Domain**

(Describe the structural and behavioral constraints)

### **a) Laws & Regulations**

1. What legislation creates constraints for factors in the case?
2. What regulatory constraints impact the case?
3. How do Constitutional issues such as 1st Amendment rights (i.e., speech, press, religion), 2nd Amendment rights (i.e., bear arms), 4th amendment (i.e., search and seizure), and 10th Amendment (states' rights) impact the case?
4. How do security constraints impact the case?
5. How do restrictions on domestic activities impact the case?

### **b) External Oversight**

1. How does Congressional oversight impact the case?
2. How does Executive oversight (e.g., Director of National Intelligence, Undersecretary of Defense for Intelligence, Office of Management and Budget) impact the case?

### **c) Fiscal Constraints**

1. How does the budget cycle affect the case?
2. How do budget ceilings and budget authorities affect the case?

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<sup>5</sup> See the section on "Information Network" for questions related to organization's internal information network.



#### **d) Technical constraints**

1. How do the physical laws of science, such as the laws of physics (e.g., law of gravity, laws of thermodynamics, speed of light,) and the laws of chemistry (e.g., Boyle's law,<sup>6</sup> Charles law<sup>7</sup>) affect the case?
2. How does time, such as the time-required-to-complete a project (i.e., the best-case fixed amount of time it takes to complete the project) and the time required to finish a step before starting the next step (i.e., the requirement to complete each prior task before moving on to the next task) affect the case?
3. How do the physical limits of the human body (e.g., limits of staying awake, survival in heat and cold, survival without food and water, ability to withstand disease) affect the case?
4. How do the psychological limits of the human being (e.g., limits of perception, perceptual-motor abilities, ability to understand language, ability to withstand stress) affect the case?

#### **e) Other limitative factors**

1. What other limitative factors are unique to this organization?
2. What is the impact of these factors on the case?

### **4. Historical Domain**

(Describe the historical context)

#### **a) Societal Environment**

1. What was the political and social history at the time the organization came into being?
2. How was the political and social history changed over the life of the organization?

#### **b) Organization**

1. What is the origin of the organization?
2. What is the history of the organization?

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<sup>6</sup> At constant temperature, the volume of a confined gas is inversely proportional to the pressure to which it is subjected.

<sup>7</sup> At constant pressure, the volume of a confined gas is directly proportional to the absolute temperature.

## **Section 2—Input Components**

(Describe the input component of the organization.)

### **1. Requirement**

(Describe the requirement to be satisfied by the output)

#### **a) The Problem**

1. What is a specific, detailed explanation of the problem or problems to be addressed by the task given to or assumed by the organization?
2. What issue or issues are expected to be resolved by the task given to or assumed by the organization?

#### **b) Objective**

1. What is the deliverable that is expected to satisfy the need?
2. What is the desired end-state?
3. What is (are) the indicator(s) of success?

#### **c) Complexity**

1. How difficult is it to separate the different parts of the problem and/or deliverable(s)?
2. How many interest groups are stakeholders?
3. What are the conditions that could hinder reaching the objective?
4. What kinds of constraints are associated with meeting the requirement?
5. What is the degree of uncertainty associated with satisfying the requirement?

### **2. Funding**

(Describe the fiscal resources dedicated to satisfying the requirement)

#### **a) Amount of Funding**

1. How much funding does the budget allocate to the activity under study?
2. Who has execution authority?

#### **b) Nature of Funding**

1. To what degree does the funding match the requirement?
2. Who has execution authority?

### **3. Staffing**

(Describe the human resources dedicated to satisfying the requirement)

#### **a) Level of Staffing**

1. How many government and contractor personnel are authorized for the project?
2. What is the vacancy rate for the authorized positions?

#### **b) Nature of Staffing**

1. What is the skill mix defined for the staffing?
2. What is the proportion of government and contractor personnel authorized for the project?

## **Section 3—The Process Components**

(Describe the process component of the organization.)

### **1. Formal Organization**

(Describe the formal arrangements between components of the organization.)

#### **a) Demographics of Organization**

1. What kind or type of organization is under study in the case?
2. What is the size of the organization?
3. What is the age of the organization, or how long did the organization exist?
4. What is the growth stage of the organization?

#### **b) Design of the Organization**

1. How is the organization structured (vertical, horizontal, etc.)?
2. What is the form of the sub-components (by function, program, matrix, location, etc.)?
3. What is the vertical differentiation (i.e., the number of supervisory levels)?
4. What is the horizontal differentiation (i.e., the number of subunits)?
5. What is the mix of government and contractor employees?
6. What is the distribution of authority?

#### **c) Administrative Intensity**

1. What is the supervisor-to-staff ratio?
2. What is the top manager's span of control (include non-supervisory personnel)?
3. How extensive is middle management?

#### **d) Bureaucratic Constraints within the Organization**

1. What are the organizational affiliations and allegiances?
2. What are the internal HR constraints?
3. What are the internal fiscal constraints?

#### **e) Work of Organization**

1. What is the nature of the organization's work environment?
2. Where is the work done in relation to the organizational components?
3. What is the complexity of the work (i.e., number of different products/services, territories of operation)?

## **2. Informal Organization**

(Describe the informal arrangements within and extending beyond the organization.)

### **a) Relationships**

1. What is the degree of awareness that the organizations' components have with each other?
2. What are the intramural relationships associated with this awareness?
3. To what extent are there informal extramural arrangements that extend beyond the formal structure of the organization?
4. What are these extramural relationships?
5. What is the intensity of the intramural and extramural informal relationships?
6. What is the impact of turnover rates on these informal relationships?

### **b) Culture**

1. What is the organizational ideology?
2. How is time regarded (e.g., value as an investable commodity; orientation to past, present, and future)?
3. What are the customs, taboos, and prohibitions?
4. What are the organizational symbols and slogans?

### **c) Influences**

1. What is the distribution of power (i.e., ability of "A" to get "B" to change)?
2. What are the influence patterns?
3. How much discretion do individuals have (i.e., the discretion individuals can exercise in making task-related decisions)?
4. What is the time span and rhythm of the organizations (planning cycles, degree activities regulated by time)?

### **d) Dependencies**

1. What are the internal dependencies?
2. What are the external dependencies?

### **e) Certainty**

1. How much agreement is there on goals and priorities?
2. How much clarity is there in how to respond to events?

### **3. Network of Individuals**

(Describe the organization's collection of individuals.)

#### **a) Demographics**

1. What is the gender ratio of the individuals?
2. What is the age range and typical age of the individuals?
3. What is the cultural composition of the individuals?

#### **b) Education**

1. What formal education do the individuals have?
2. What informal education do the individuals have?

#### **c) Skills**

1. What are the skills directly related to the task?
2. What are the skills associated with related tasks?

#### **d) Experience**

1. What is the typical tenure of individuals?
2. What experience do they have in the discipline of national reconnaissance?
3. What experience do individuals have directly related to the task?
4. What experience do they have in related industrial sectors?

#### **e) Style**

1. What behavioral and attitudinal preferences do the individuals have?
2. Are individuals task-oriented or relationship-oriented?
3. Are individuals introverts or extroverts?
4. What communication styles do the individuals exhibit?
5. How do individuals resolve conflict?
6. What behavioral patterns do individuals exhibit?

#### **f) Affect and Motivation**

1. What are the expectations of the individuals?
2. What are the needs of the individuals?
3. What rewards do the individuals seek?

## **4. Information Network**

(Describe the arrangements within the organization for communicating information.)

### **a) Formalization**

1. What is the degree to which rules govern information exchange between individuals within the organization?
2. What is the degree to which rules govern information exchange between groups?
3. To what degree is there centralized control of information sharing?
4. How spontaneous are the communications?

### **b) Mode of Communication**

1. What is the range of information-sharing modes (i.e., face-to-face conversations, telephone, memos, email)?
2. What is the distribution of information sharing across the modes?
3. How do meetings compare with individual conversations as modes?
4. What kinds of internal employee publications (such as newsletters) are there?

### **c) Frequency**

1. What is the frequency of personal communications?
2. What is the frequency of group communications?
3. What is the frequency of organizational component communications?
4. What is the timing, rhythm, and urgency of communications?

### **d) Quality & Content**

1. How much communication is task-related?
2. How much communication is socially oriented?
3. How difficult is it to make contact with people?
4. How often do communications get lost?
5. How useful do individuals find communications?

## **5. The Task**

(Describe the organization's work activity directed toward satisfying the requirement.)

### **a) Nature of Task**

1. What kind of task is involved?
2. How much time is required for the task?
3. What is the task variability (the number of exceptions encountered in the course of the work)?
4. What is the degree of uncertainty associated with the task?

### **b) Difficulty of Task**

1. What is the analyzability of the task (i.e., the ease and clarity of knowing the nature and order of what needs to be done)?
2. What is the predictability of the task (i.e., the ease with which individuals can determine the outcome of a particular sequence in advance)?

### **c) Expertise for Task**

1. What skills are required for the task?
2. What specialization does the task require?



## Section 4—Outcome Components

(Describe the outcome component of the organization.)

### 1. The Deliverable(s)

(Describe the product of the organization's work and the process that resulted from trying to satisfy the requirement.)

#### a) Nature of the Deliverable

1. What is the deliverable?
2. What kind of deliverable (e.g., hardware, software, information, intellectual property, an organization, a building, system)?
3. What is the value of the deliverable?
4. What is the expected lifespan of the deliverable?

#### b) Utility of the Deliverable

1. What are the functions and capabilities of the deliverable?
2. How efficient is the deliverable?
3. What are the applications and uses for the deliverable?
4. How adaptable is the deliverable?

### 2. Process Change

(Describe how the system and its environment changed during the process.)

#### a) Internal

1. What are the changes that have taken place within the system?
2. What kinds of changes are these?
3. What is the scope of these changes?
4. How different is the system at the time of output compared with the time of input?
5. What is the likely impact of these changes?

#### b) External

1. What are the changes that have taken place within the environment?
2. What kinds of changes are these?
3. What is the scope of these changes?
4. How different is the environment at the time of output compared with the time of input?
5. What is the likely impact of these changes?

## Appendix F—Outline for Lessons-Learned Case Assessment

### Overview of Appendix F

This appendix provides an outline for writing the lessons-learned case assessment. You will notice that the appendix to the case assessment is the case description outlined in Appendix E to the monograph.

#### **Abstract**

(Draft a short one- or two-paragraph abstract to serve as a high-level summary.)

#### **Executive Summary**

(Draft a two- to three-page summary of the assessment that identifies and explains the lessons.)

#### **The Lessons**

(Start the executive summary with a short statement that summarizes the lessons.)

#### **Outlook**

(Include a brief summary of the outlook section from the main report.)

#### **Main Report**

(Draft the report with the main points up front. In other words, lessons first; explanations next; background last)

#### **The Lessons**

(State and explain what your lessons are about. Formulate your statement of the lessons in a behavior/consequence phraseology as explained earlier in this monograph.)

#### **Outlook**

(Discuss the significance of the lessons and what role their application would likely play on the organization's outcome, also address the consequences of ignoring the lessons.)

#### **Background**

(Include any historical context in this section)

#### **Appendix – The Case Description**

(Incorporate the case description prepared for phase II of the research as an appendix.)

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