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- Its central objective is to publish articles that advance the theoretical and research agenda of the intelligence and analytical fields related to military, law enforcement and criminal justice.
- Its emphasis is upon empirical research, qualitative studies and scientific methodology, with priority given to articles reporting original research.
- It includes articles needed to advance the intelligence analysis profession.
- Its emphasis is upon providing more informed dialogue about analytical policies and practices and the empirical procedures related to these policies and practices.

Submissions are considered from many sources including field-level analysts, investigators, senior policy-making officials, and college and university faculty and researchers. Please submit your work as soon as possible to be considered for publication consideration.

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FROM THE EDITORS

The past decade has spurred an increase in the number of intelligence-related publications, but the *Journal of Intelligence & Analysis*, first known as the *Law Enforcement Intelligence Analysis Digest* and then as the *IALEIA Journal*, has been a long-standing (since 1985) communication and collaboration arena for professionals and academics. Highlighting emerging research and best practices in the field, the *Journal of Intelligence & Analysis* guides practitioners and researchers: spawning ideas, encouraging replication of evaluation studies, inspiring collaboration with other like-minded researchers, serving as a base for crafting and refining process and practice, generating support for intelligence policy and practice, and providing direction for future research.

We are pleased that this edition reflects depth and breadth of quality intelligence analysis research worldwide, and provides an opportunity for both well-established and emerging scholars to present insights to a worldwide audience of skilled practitioners and academics.

Access to analytic tools, how an organization applies analysis to solve problems, and organizational policies and procedures may differ, but intelligence analysis theory and practice rely upon consistent implementation of intelligence-led policing to improve and standardize the practice and the profession of intelligence.

The articles within reflect many of the challenges inherent in the intelligence analysis profession; but also seek to direct improvements in evaluation, training, and meeting the needs of intelligence customers. The perspectives by the authors in this edition are a welcome addition to the intelligence literature.

Our thanks to the authors and reviewers for their thoughtful collaboration. And an open invitation to our readers: We hope you continue to research, write, and contribute to the success of the *Journal of Intelligence & Analysis*.



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Beyond Tradecraft: Intelligence Analysts Learn through “Non-tradecraft” Behaviors

ADRIAN WOLFBERG, PH.D.¹

Abstract

The law enforcement, national security, and competitive intelligence analysis profession relies on its education and training to advance tradecraft skills such as critical thinking and other cognitive-based knowledge and skills. In this article, “non-tradecraft” behaviors associated with individual actions and interactions with other individuals are reviewed and shown to have a significant and positive effect on improving learning. Yet analytic education and training programs neither incorporate nor develop these behaviors. The quantitative study, based on a survey of IALEIA analysts, analyzes the simultaneous effects of three non-tradecraft behaviors (filtering, networking, and dialogue) on information overload, ambiguity, perspective taking, and feedback. An eight-step sequence of recommendations is made for incorporating non-tradecraft skills into the intelligence profession, along with recommendations for two areas of future research.

Keywords: Mitigation behavior, overload, ambiguity, perspective taking, feedback, filter, network, dialogue, learning, IALEIA, information properties, dispositional cues.

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Introduction

No decision maker likes surprises. Researchers interested in national, law enforcement, or financial security have called for improvements in the nation's capacity to anticipate and mitigate surprise (Gilad, 2004; Grabo, 2002; Osborne, 2006; Taleb, 2010). Such capacity rests on the skills and actions of security professionals. The success of these professionals is largely dependent on the extent to which these intelligence professionals learn by gradually shifting their mental models of the environment (Weick, 1993).

Opinions abound on how to improve learning. Proposals include: promoting critical thinking (Harris, 2011; Moore, 2007); varying the use and type of knowledge deployed (Miller, 2008); changing organizational structures (Barger, 2005); deploying new visualization and representation techniques (Thomson, Hetzler et al., 2005); increasing the collection and amount of information (Dahl, 2010); overcoming psychological biases (Heuer, 1999); educating decision makers (Wilder, 2011); collaborating with decision makers (Davis, 2003); collaborating and networking with analysts (Heuer & Pherson, 2011); and increasing the public's understanding of the critical role of intelligence as to garner outside views for suggestions for improvement (Fingar, 2011). Unfortunately, most of these and a host of similar suggestions often fail to account for how analysts learn within an ambiguous and complex environment. Without an understanding of the inputs into the analyst's learning, it is unlikely significant improvements in learning will occur.

This article reports the results of a study of law enforcement analysts who are members of the International Association of Law Enforcement Intelligence Analysts (IALEIA). The purpose of the study is to ascertain to what degree analysts' interactions with their environment, including decision makers, influence their ability to make sense of the world they analyze. Is there something else besides critical thinking skills that affect the analyst's ability to create new or different knowledge? Specifically, this study explores whether behaviors appearing to have nothing to do with analytic or critical thinking could also contribute to helping the analyst see new patterns or shift their mental models. Such factors are called non-tradecraft behaviors; this study finds that non-tradecraft behaviors improve analyst learning.

How This Study Differs from Past Studies

Few empirical studies examine learning as an outcome within the micro-processes, the individual's actions and the interactions among individuals, of information exchanges between an information provider and a decision maker (Rouleau, 2005). Those that exist study one factor at a time. None of the studies research the intelligence analysis context. In this study, multiple factors are examined simultaneously in an attempt to reach a deeper, systematic understanding of the actual working conditions and their effects on an intelligence analyst.

A literature search was conducted to locate empirical examples of a causal relationship between any of the input factors and non-tradecraft behaviors used in this study and learning. Eleven empirical studies were found (Ashford & Tsui, 1991; Bruner, Postman et al., 1951; Dearborn & Simon, 1958; Donnellon, Gray et al., 1986; Grant & Berry, 2011; Levin & Cross, 2004; Majchrzak, Beath et al., 2005; Mengis, 2007; Postman & Bruner, 1948; Traxler & Gernsbacher, 1993; Wood, Bruner et al., 1976). Their findings are summarized in Table 1.

Table 1
Summary of Empirical Research

INPUT	OUTCOME	Findings	Author and Reference	Goal of Study	Type of Study
Overload	Learning	As the number of words is increased, and time reduced, frustration prevents subjects from improving the ability to recall what they read.	Postman & Bruner; 1948	What occurs with perception when under stress	Experiment: 5 experimental subjects and 5 control subjects read sentences of varying lengths under different time
Equivocality	Learning	As equivocality increased, the difficulties in distinguishing colors led subjects to assimilate in the direction of expected value (reinforce mindset).	Bruner, Postman & Rodriguez; 1951	How much information is needed for an individual to confirm or revise a hypothesis	Experiment: Four experiments were conducted using various shaped objects of different degrees of color
Perspective Taking	Learning	Writers communicate more effectively when they take their reader's perspective because perspective taking helps writers form a mental representation of how readers interpret their texts.	Traxler & Gernsbacher; 1993	Are writers better able to have their readers interpret the meaning if the writers take their reader's perspective	Experiment: three experiments using undergraduate students involved in writing and reading narrative
Perspective Taking	Learning	Perspective taking strengthens creativity	Grant & Berry; 2011	Does perspective taking interact with intrinsic motivation to enhance creativity	Mixed Methods: (1) Survey 90 security officers; (2) Survey 111 employees at treatment plant; (3) experiment undergrads
Feedback	Learning	Managers likely to use inquiry(dialogue) with superiors, and used direct and indirect monitoring with superiors and subordinates	Ashford & Tsui; 1991	Managers use feedback from superiors more than subordinates and peers	Survey: 387 executives, their superiors, peers and subordinates from a large agency composed of five regions
Dialogue	Learning	As the child ages (from 3 to 5), the proportion of assistance that the child gets/needs from dialogue outweighs direct intervention in learning how to construct the toy pyramid	Wood, Bruner & Ross; 1976	Interactive relationship between developing child and elder	Experiment: 30 children, ages 3- 5, constructed pyramids toy blocks
Dialogue	Learning	Individuals were able to overcome differences in interpretation and make retrospective sense of what they experienced; the use of metaphors during dialogue were especially useful for reconciling differences	Donnellon, Gray & Bougon; 1986	Identify the communication mechanisms responsible for sense-making	Discourse Analysis: a behavioral simulation of an organization as part of a 23-student undergraduate course in organizational theory

Table 1
Summary of Empirical Research (continued)

INPUT	OUTCOME	Findings	Author and Reference	Goal of Study	Type of Study
Dialogue	Learning	Dialogic processes that involve both the client and the developer (as opposed to one or the other listening or talking) help clients to learn.	Majchrzak, Beath, Lim & Chin; 2005	How do teams facilitate their dialogue to enhance client learning	Survey: 17 project teams were surveyed three times over the course of a 12 week design
Dialogue	Learning	Decision makers tend to be oriented to finding “yes or no” answers yet experts think in terms of “it depends.” Experts/ decision makers use boundary objects to overcome challenges.	Mengis; 2007	How do decision makers integrate knowledge experts convey during face-to-face discussion	3 Case studies: Scholars with U.S. Senate; management consultants and clients; insurance IT specialists
Filtering	Learning	Most important problems identified by executives were related to their own department rather than look at the problem from a company-wide perspective	Dearborn & Simon; 1958	Presented with a complex stimulus, how does the individual shift mindset	Case Analysis: a group of 23 middle managers were asked to read a 10,000 word narrative about their company
Networking	Learning	Trust amongst networks can improve organizational learning, especially in stressful situations	Levin & Cross; 2004	Effect of lack of trust in network communications and knowledge transfer	Survey: 128 respondents from a British bank, American pharmaceutical company, and a Canadian oil and gas company

Analyst Sense-making

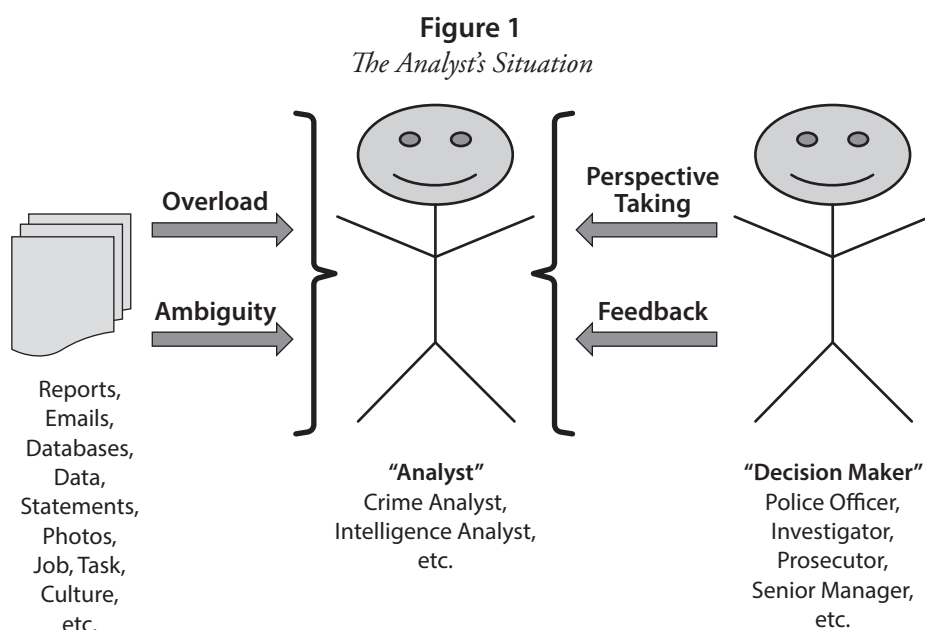
A field study in 2011 (Wolfberg, Boland et al., 2012) examined twenty-nine intelligence analysts who provide intelligence to senior United States policymakers. In that study, it was clear the analyst faced a variety of inputs and used many non-tradecraft behaviors that affected the success of his/her support to a decision maker. The study found that the analyst, when faced with inputs that were either impediments or new opportunities for learning, used several alternative behaviors either to mitigate or capitalize upon the types of information at hand. For example, one factor was the negative effect of information overload in preparing a product; and the other was the positive effect of figuring out what the decision maker wanted by analysts placing themselves, metaphorically, in their decision maker’s shoes. The study identified a complex array of interactions among information inputs, behavioral mechanisms and learning outcomes. However, the detailed nature and specific effects of those behavioral mechanisms were not explored further. In 2012, a second study was conducted to test the findings on a larger scale to ascertain any commonality for these non-analytic factors in intelligence analysts (Wolfberg, Lyytinen et al., 2013). This article reports the results of that 2012 study.

Inputs, Non-tradeecraft Behaviors, and Learning

INPUTS

Two types of inputs into analyst sense-making were considered: information properties and behavioral dispositions. For the study, two information properties were selected: information overload and ambiguity. Overload is the extent an analyst thinks the quantity of information, task, etc. overwhelms them or not (Daft & Macintosh, 1981; Eppler & Mengis, 2004). Ambiguity means the data or the situation can be interpreted by the analyst in two or more ways (Daft & Lengel, 1986; Daft & Macintosh, 1981; Weick, 1979).

The second type of input is behavioral dispositions, which are important contextual cues about the decision maker that, if available, might help the analyst prepare and deliver their product. Two cues were selected: perspective taking and feedback. Perspective taking is the ability of the analyst to adopt the perspective of the decision maker to understand what and how information can be communicated effectively during the analyst interaction with the decision maker (Ackermann, 1996; Grant & Berry, 2011; Parker & Axtell, 2001). Feedback is the ability of the analyst to monitor verbal and nonverbal communication from the decision maker about the analyst's behavior and performance (Ashford, Blatt et al., 2003; Morrison, 2002). Figure 1 shows these four factors, which characterize the study's scope. Certainly not all factors that affect an analyst are considered, but these four are a representative set.

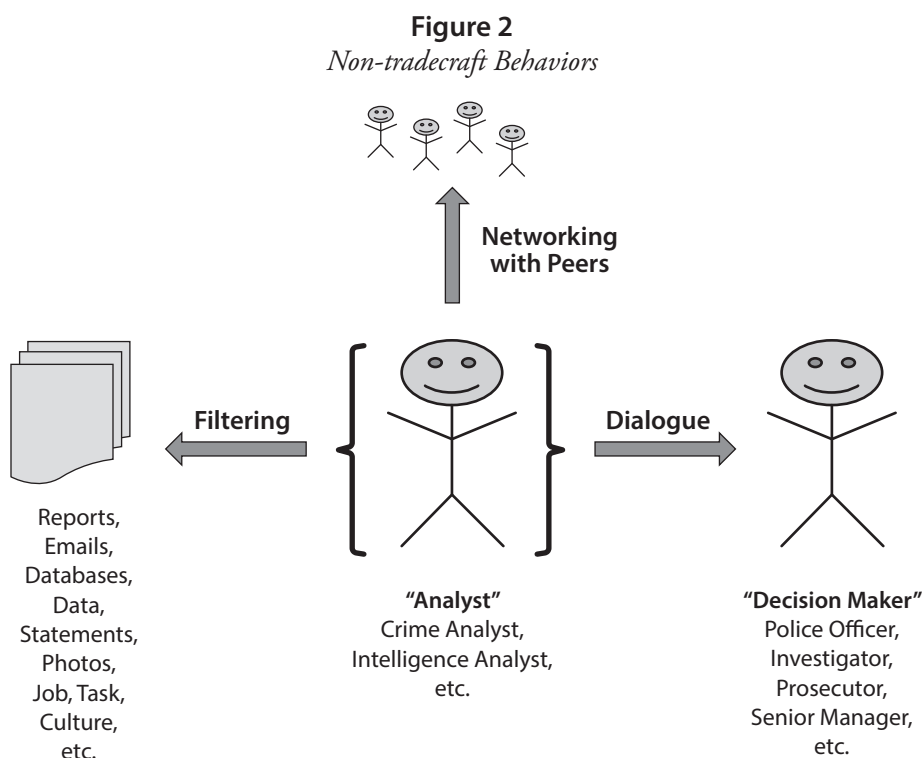


NON-TRADECRAFT BEHAVIORS

The study then considered the non-tradeecraft behaviors that might be employed as mitigation strategies by analysts. Social learning theory avers behavior mediates the relationship between the environment and the individual's cognitive interaction with the environment, and outcomes of behavior (Davis & Luthans, 1980). Social learning theory suggests individuals learn by engaging in behavioral responses to inputs. Such responses

can be viewed as mechanisms that either attenuate or enable the effects of inputs onto learning. In some cases, these behaviors can mitigate negative effects of high levels of information overload, for example. In other cases, the behaviors may capitalize upon novel information available in the situation such as feedback.

Three types of non-tradecraft behaviors were considered based on the 2011 field study: filtering, networking, and dialogue. Filtering is an analyst's selective attention to pieces of available information while ignoring other pieces. Filtering has long been studied as a primary behavior to mitigate the negative effects of overload (Eppler & Mengis, 2004; Miller, 1960). Networking, for the purpose of this study, is the social interaction the analyst has with peers to clarify issues, find new information, or validate a response (Cross, Borgatti et al., 2001; Cross & Sproull, 2004). Dialogue is the analyst's purposeful behavior to speak with the decision maker to gain insights and clarifications so the analyst can compare what the analyst thinks is important, clear, and valid with what the decision maker thinks (Baker, Jensen et al., 2005). Figure 2 depicts the three non-tradecraft behaviors tested in the study.



LEARNING

This study seeks to understand whether the analyst is able to learn amidst a complex work environment. Individual learning has been studied in a variety of ways. The study defines learning as an individual's shift in mental models (Gioia & Mehra, 1996; Norman, 1982; Vandenbosch & Higgins, 1996; Weick, Sutcliffe et al., 2005). This view is anchored in cognitive psychology. It reflects how individuals interpret and orient themselves in a complex world by constructing, changing, or maintaining a mental model of that world

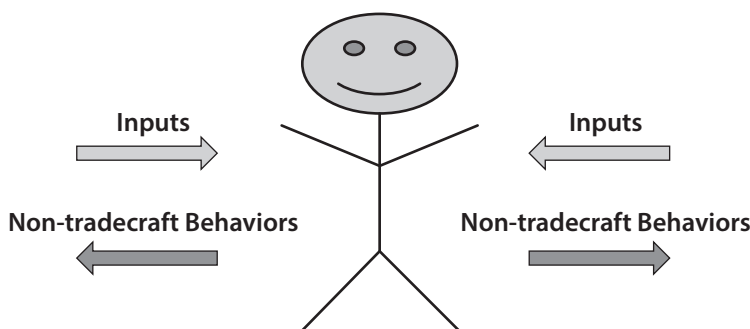
(Leahey & Harris, 2001). The mental model is a cognitive framework through which individuals assimilate or accommodate new information by comparing similarities and differences resulting in shifts in the mental model (Piaget, 1954).

Experiencing such a shift leads one to see the world differently. This is accomplished by placing the specifics of one's observations into a revised broader context and by imbuing new meaning to experience, data, and events (Polanyi, 1959). This study was designed to test whether non-tradecraft behaviors, rather than cognitive skills, can lead analysts to learn. Figure 3 represents the analyst's balancing act between inputs and non-tradecraft behaviors, and whether the analyst can learn in these circumstances.

Figure 3

The Analyst's Balancing Act

The Analyst's Situation – A Balancing Act



Does the analyst learn during this balancing act?

Methods

Survey questions were adapted from the research literature. Each question is measured using a five-point Likert scale anchored by extremes of “strongly disagree” and “strongly agree.” The outcome variable, Learning, uses four questions to measure whether the person changes his or her mental model to fit new information and is responsive to disconfirming information to change or question the model. For example, one of the questions is “my job often results in examining my perspectives.”

The four inputs are:

1. Equivocality (i.e., ambiguity), four questions to measure the extent an analyst thinks the content of information lends itself to different and conflicting interpretations (e.g., “when I encounter unfamiliar data, I am often unclear about its meaning)
2. Overload, four questions to measure the extent to which the volume of information exceeds the ability of the analyst to adequately read and understand the information in a given situation (e.g., “I usually have too much information to look at”)

3. Perspective Taking, three questions to measure the analyst's (cognitive) process of adopting the other's viewpoint in an attempt to understand the other's information processing preferences, values, and needs (e.g., "I always seek to understand the decision maker's specific viewpoint about data I am presenting"), and
4. Feedback, three questions to measure whether the analyst pays attention to the environment around him/her—especially the decision-maker—in providing signals how the analyst is performing (e.g., "I normally see how well I am delivering my presentation by watching the decision maker").

The study considered non-tradecraft behaviors as mediators. Mediators are explanatory factors which explain or mitigate the relationship between variables² (Mathieu & Taylor, 2006; Preacher & Hayes, 2004). Three non-tradecraft behaviors are used:

1. Dialogue, three questions to measure whether an analyst participates in a discussion with the decision-maker for the purpose of ensuring that understanding takes place and, if not, to ensure that dialogue elicits further clarification and understanding (e.g., "when talking with a decision maker, I use the opportunity to better understand her/his goals")
2. Filtering, three questions to measure an analyst's decisions concerning what he/she wants or needs to accomplish to prioritize information elements necessary to achieve his communication objectives with a decision maker (e.g., "I always prioritize my correspondence, emails, and reports based on what is important to me that day"), and
3. Networking, four questions to measure the actions taken to employ social or professional relationships to provide knowledge that otherwise was not known (e.g., "I seek out other analysts to help me think through an analytical question to make sure I am on the right track").

Informed by what is known about the nature of knowledge work (Davenport, 2005), this study controls for seven factors that may affect analyst's learning: age, gender, experience, country where employed, assignment to a "fusion center" or full-time "task force," employer, and formal education. Results show that gender influences analyst learning; however, other control factors have no effect in this study. Post-study analysis indicates women who took the survey benefit from the positive effects of perspective taking (cues from a decision maker) and, consequently, the female analysts increase their learning outcomes. Men, on the other hand, are not affected by perspective taking to improve learning outcomes. This type of gender difference has some support in previous research literature (Kolb & Kolb, 2005). Future research is needed to verify this unexpected finding.

Sample

Permission was granted by the Board of Directors of IALEIA to e-mail the survey to its members in the United States and Canada, who make up approximately ninety percent

² For example, if I walk down the street and it starts raining, I will get wet. But if I use an umbrella, the umbrella stops me from getting wet. The umbrella mediates the causal relationship between rain and getting wet. In this case it completely stops me from getting wet; there is full mediation. If, however, it is raining really hard, my umbrella may only partially keep me dry. In this case, the umbrella only partially mediates the effect of rain. Parts of me get wet, other parts stay dry.

of the IALEIA membership. IALEIA is a non-profit organization made up of primarily federal, state, and local government employees whose skill and occupation is intelligence analysis. These employees process critical and timely information from various sources, produce knowledge about international and domestic security threats, and interact with decision makers who can take policy and operational actions based on this knowledge. For these reasons, this group of law enforcement analysts is assessed to be a representative sample of an intelligence analyst population.

Surveys were emailed to 1,451 IALEIA members in June 2012. A cover letter stated the IALEIA Board gave its permission to conduct the survey. There were 394 responses, a 27% response rate, which is an acceptable response rate for academic surveys (Baruch & Holtom, 2008). Of these responses, 58 were eliminated; seventeen were incomplete and 41 were from non-analyst IALEIA members (mostly students and professors, vendors, and individuals who identified themselves as not in analytic roles). This left 336 usable responses. The demographics of the 336 respondents are shown in Table 2.

Table 2
Survey Respondent Demographic Data (n=336)

Demographics	Category	Number	Percent
Gender	Female	179	53.3%
	Male	157	46.7%
Work in Fusion Center? (A multi-agency facility created to improve collaboration between different agencies)	Yes	115	34.2%
	No	192	57.1%
	Not applicable	29	8.6%
Work Location	United States	253	75.3%
	Canada	83	24.7%
Education	High School Diploma	39	11.6%
	Associates degree	38	11.3%
	Bachelor's degree	157	46.7%
	Master's degree	92	27.4%
	PhD or equiv.	5	1.5%
	Professional degree (MD/JD)	5	1.5%
Experience as analyst	Less than 2 years	23	6.8%
	2-5 years	80	23.8%
	6-10 years	88	26.2%
	11-15 years	62	18.5%
	16-20 years	25	7.4%
	21-25 years	31	9.2%
	26+ years	27	8.0%
Employer	Federal agency	101	30.1%
	State/Province agency	81	24.1%
	County/City agency	118	35.1%
	Other	36	10.7%
Age	20-29 years	26	7.7%
	30-39 years	88	26.2%
	40-49 years	113	33.6%
	50-59 years	84	25.0%
	60 years and above	25	7.4%

Analysis

Analysis³ of the data consists of comparing two models in order to demonstrate the effect of non-tradecraft behaviors on learning. The first model does not include the non-tradecraft behaviors; the second model does.

FIRST MODEL

The first model tested only the four inputs and learning. The results indicate a combination of expected and unexpected results based on what is known from other scholarly studies. The expected results are that 1) overload reduces learning and 2) perspective taking improves learning. These findings align with previous study results. Unexpected, however, is that ambiguity neither reduces nor improves learning. This finding is a surprise, since ambiguity is theorized to be a major obstacle to organizational learning (Weick, 1979, 1995; Weick, et al., 2005). In a post-analysis experiment, ambiguity was tested alone with learning, without the influence of the other factors, but it also has no significant effect on learning. This finding is a primary motivator for a current study (in progress).

Analysis indicated the type of monitoring feedback in the model neither improved nor reduced learning. This finding is contrary to previous empirical research, which suggested feedback improves learning (Ashford, et al., 2003; Morrison, 2002). In this study the four inputs were tested simultaneously. The lack of a positive effect from feedback may be confounded by other inputs (MacKinnon, Krull et al., 2000). But, when only feedback is tested with learning without the other inputs, feedback improves learning. The interpretation of this surprising result is that overload eliminates the otherwise improved effect that feedback has on learning. Feedback may be a fragile source of behavioral cues from a decision maker. On the other hand, perspective taking continued to improve learning even in the face of the negative effect of overload.

SECOND MODEL

The second model introduces the non-tradecraft behaviors of filtering, dialogue, and networking to see if the analyst uses these behaviors to improve learning in the face of either negative or positive effects of the four inputs discussed above. Some results supported prior research, but some of the findings were unexpected. Overall, use of non-tradecraft behaviors in the second model improves learning almost twofold compared to the absence of non-tradecraft behaviors in the first model.

Study Results

FILTERING REDUCES OVERLOAD

Analyst use of filtering supports the expected finding that filtering is an effective mechanism to eliminate overload's negative effect on learning. On the other hand, filtering had what appeared to be an unintended side effect, reducing perspective taking's improvement to

³ An exploratory factor analysis is used to determine factorability and, based on key measures, is determined it is factorable. A confirmatory factor analysis is then performed to assess the statistical fit of the measurement model and achieves excellent fit. Finally, a structural model is created which also has an excellent statistical fit. Hence, the model was used to investigate the simultaneous non-tradecraft behavioral effects filtering, networking, and dialogue have on the combined relationships among overload, equivocality, perspective taking, feedback, and analyst learning.

learning. Thus, the effort to use filtering to offset overload’s reduction in learning comes at a cost; it helps reduce overload but it also reduces the analyst’s ability to pay attention to the cues of the decision maker.

NETWORKING REDUCES OVERLOAD

Networking has a similar effect as filtering. Networking helps eliminate overload’s reduction in learning. This result is consistent with Meier’s (1963) classic study of university students in library situations where the increasing demand to check out books based on course assignments caused students to seek out friends in the same class who might already have the book rather than go to the card catalog, library shelf, or reference desk. Similarly, networking had the net effect of reducing perspective taking’s improvement on learning, though perspective taking continued to improve learning to a lesser degree. The use of networking to offset the negative effect of overload has some unintended consequences; it reduces the analyst’s ability to pay attention to the cues from the decision maker.

DIALOGUE WITH DECISION MAKER IMPROVES LEARNING

Dialogue is the most interesting and complex non-tradecraft behavior tested. Figure 4 summarizes the conditions under which dialogue affects learning. Dialogue has the effect of both improving and reducing learning, depending on which input dialogue affects, and whether dialogue has a mediating or suppressive effect. Expectations are dialogue improves learning when the analyst is able to take advantage of perspective taking. The study demonstrates this expectation. By understanding the decision maker’s preferences, the analyst can use that information to make the dialogue more productive.

Figure 4
The Complexity of Dialogue

Conditions under which Dialogue Affects Learning

		Outcome	
		Decreases Learning (–)	Increases Learning (+)
Dialogue Effect	Mediated	Overload	Perspective Taking
	Suppressive	Ambiguity	Feedback

An unexpected result of feedback, delineated above, was that dialogue is able to bring to the surface the positive aspects of feedback on learning. When testing the first model, the negative effect of overload virtually eliminates feedback's improvement to learning. When dialogue is employed, however, the dominating negative effect of overload is suppressed, and some of the positive benefit of feedback resurfaces and improves learning. The interpretation of this result is when the analyst engages in dialogue with a decision maker, the act of engagement, the interaction between the two, affords the analyst the opportunity to monitor feedback either verbally or nonverbally communicated to the analyst. If dialogue is not employed, feedback from the decision maker would not be accessible by the analyst, and therefore not have an effect on learning.

DIALOGUE WITH DECISION MAKER REDUCES LEARNING

On the other hand, dialogue reduces the negative effect of overload, but is not able to eliminate it; the net effect of dialogue when overload is present is a reduction in learning. This finding indicates if overload is weighing down the analyst, engaging in dialogue may be effective in isolating the decision maker's topics or preferences of interest, thereby reducing the amount of information to which the analyst must pay attention to answer the decision maker's questions. The net result may be reduction, but not elimination, of the negative effect of overload on learning.

Ambiguity is different. Similar to the effect of feedback on learning, dialogue brought to the surface what had otherwise been suppressed by ambiguity. The process of dialogue involves the constant task of articulating and refining meaning. Dialogue under conditions of ambiguity makes it difficult for the analyst to compare similarities and differences in the decision maker's meaning. Thus it is difficult to relate the decision maker's meaning to the analyst's mental model, creating confusion in the analyst, causing a reduction in learning. When an analyst is confused, talking to a decision maker spreads confusion to the decision maker who, in return, does not provide helpful information to the analyst, nor can the analyst interpret the decision maker effectively.

This finding may at first appear to contradict prior research (Daft & Lengel, 1986; Daft, Lengel et al., 1987) that concluded dialogue was helpful in clarifying ambiguity. However, it actually presents a different context for ambiguity. Daft and colleagues studied ambiguity from a manager's perspective of communicating tasks to subordinates and found under the most ambiguous tasks, the meaning of the communication to subordinates is best clarified through dialogue (as opposed to sending a memo, for example). However, in the context of this article, the relationship is reversed. Analysts are typically subordinate to law enforcement managers, and these findings indicate analyst-initiated dialogue containing ambiguity reduces learning.

Discussion

The considerable negative effect of information overload on an analyst's ability to learn should alert both the analyst and the manager. Overload is likely a condition taken for granted; yet it appears to have important unconstructive effects. In one way, overload greatly reduces the benefit otherwise received by monitoring feedback from decision makers. Without feedback, the analyst may miss important cues that could be included to improve future intelligence products. An analyst's use of filtering, which is clearly an

effective response to overload, also has a somewhat harmful side effect of reducing the positive benefit of perspective taking. The same side effect is evident with networking; it reduces the positive benefit of perspective taking as well.

The role of dialogue is shown to be an extremely complex non-tradecraft behavior. Dialogue is a double-edged sword for learning, a powerful behavior available to the analyst. The intelligence profession is only beginning to realize the importance of dialogue. As a result of this study, it is evident dialogue can improve or reduce learning, depending on what else is affecting the analyst. If the analyst is experiencing overload, engaging in dialogue with the decision maker could limit the analyst's chance to learn. Similarly, if the analyst is experiencing ambiguity, dialogue with the decision maker may adversely affect the analyst.

On the other hand, if the analyst is effectively accessing the decision maker's cues through perspective taking, then dialogue will help the analyst learn. This study indicates the positive effect of feedback when the analyst engages in dialogue with the decision maker.

More research is needed, especially in considering how combined effects are influenced by dialogue. For example, what is the net effect on analyst learning if, on one hand, dialogue reduces learning because of overload experienced by the analyst, and, on the other hand, dialogue improves learning because of decision maker feedback that the analyst could exploit? Awareness of the effects of overload and ambiguity, and taking action appropriate for the context, will improve analyst learning; and managers and analysts will want to optimize these effects. A discussion of the strategies for such action, however, is beyond the scope of this article.

Recommendations

The intelligence profession should expand its educational and training focus beyond tradecraft as the target for learning, and include non-tradecraft behaviors that affect learning. This article's research identifies a few of these behaviors: filtering, networking, dialogue, and inputs such as overload and ambiguity.

Professionals can begin to think about how to leverage non-tradecraft behaviors, through formal and informal venues. The following eight steps are suggested as a way ahead. First, analysts or managers can use an informal after-action review process to talk about incidents they experience where non-tradecraft behaviors added or detracted from analyst (or manager) learning. Second, analysts can meet periodically, physically or virtually, to discuss their learning environment so they can begin to be more aware of the effect of non-tradecraft behaviors. Third, as individuals become more familiar with actual examples of non-tradecraft behavior effects on learning, analysts and managers can include these in the dialogues they have among themselves as part of professional networking, for example. Fourth, analysts can share their experiences of how non-tradecraft behaviors affect learning in newsletters, bulletin boards, and articles in practitioner journals. Fifth, as time goes on, educators and academics can create case studies for use in the publication of journals and use in education and training courses. Sixth, as time and awareness increase, analysts who attend analyst conferences within the law enforcement, national security, and competitive intelligence domains can discuss non-tradecraft behaviors and submit topics for presentation. Seventh, as the profession gains more familiarity with non-tradecraft learning behaviors, formal seminars and courses can be developed to cater to the analyst profession writ large. Finally, as the analyst profession gains greater understanding of

non-tradecraft behavioral contributions to learning, the analyst profession can increase its understanding of decision maker's contexts, biases, and behavior patterns.

Two areas require future research. This study of learning within a decision-making context was focused on the behaviors of the analyst and did not cover the decision maker's learning behaviors. Future research should be extended to 1) include the decision maker and 2) analyze learning under similar or different complex contingencies of varying information properties, cues to behavioral disposition, and behavioral responses. Since it is known an analyst's perspective taking and engagement in dialogue with decision makers is likely to improve learning, it would be beneficial to determine if these properties and behaviors influence the decision maker, and under what contingencies.

Another area is to increase granularity about the analyst work experience. For analysts operating in complex information environments, this study suggests that analyst behaviors matter: the effects of non-tradecraft behaviors can offset the negative effects of overload and ambiguity, while at the same time their responses to the positive cues of perspective taking and feedback tend to improve learning, though at a reduced level. While the net result is an overall positive effect on analyst's learning, this study suggests that a dynamic may be at play where analysts in complex, rich environments must devote their cognitive efforts to offset the negative inputs at a cost of fully capitalizing on the positive inputs. A future research step would be to investigate effects of other inputs so as to understand whether these contingencies will have differential effects upon learning. For example, under what inputs and non-tradecraft conditions does learning fail?

Summary

The most important implication from this study is learning, defined as shifts in mental models, occurs through the use of non-tradecraft behaviors of filtering, networking, and dialogue in response to the inputs of overload, ambiguity, perspective taking, and feedback. To date, this research may be the first of its kind to study the magnitude and simultaneity of interactions between an analyst and decision maker, and their effects on learning. These results strongly suggest that while learning may occur as a result of education and training of cognitive skills such as critical thinking, learning also occurs during the analyst's everyday behaviors, but outside of the usual analytic domain. These non-analytic behaviors are different than the content and competencies involved with executing analytic tasks, what might be called analytic tradecraft.

Learning, as suggested by this study, is affected by "non-tradecraft" behaviors as well. Based on the methods and procedures used, the results show the non-tradecraft behaviors of filtering, networking, and dialogue provide law enforcement organizations with important positive mechanisms overall for learning. This phenomenon probably occurs in similar professions such as foreign intelligence analysis and competitive intelligence analysis. Non-tradecraft behaviors can help the analyst to mitigate the negative effect of overload and build upon the positive effect of perspective taking. More importantly, the interplay between the interactions primarily through dialogue produces a dramatic improvement in analyst learning.

About the Author

Dr. Adrian Wolfberg has more than 30 years experience as an intelligence analyst: as a United States Naval Flight Officer aboard the carrier-based EA-3B SIGINT aircraft, as a Naval Reserve intelligence officer, and most recently as a civilian intelligence analyst with the Defense Intelligence Agency. He obtained his PhD from Case Western Reserve University's Weatherhead School of Management. His research focus is organizational communication behaviors between analysts and decision makers. The outcome of this research should improve analyst training in the commercial and government sectors, and reduce the overall problems in communicating technical knowledge. He is currently a visiting professor at the US Army War College in Pennsylvania.