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How Information Overload and Equivocality Affect Law Enforcement Intelligence Analysts: Implications for Learning and Knowledge Production

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Abstract

Police chiefs and superintendents make policy and operational decisions using knowledge produced by law enforcement intelligence analysts who are exposed to various effects of information overload and equivocality. To better understand how these effects influence the knowledge they produce, we asked law enforcement intelligence analysts in the United States and Canada to participate in a survey and follow-up interviews. We found that intelligence analysts use various techniques to mitigate the constraints of these effects when present and/or to amplify their benefits when absent, which helps them learn (e.g., detect new patterns and gain new insights). The results indicate different types of individual learning develop from different combinations of overload and equivocality they experience: *cooperative*, *focused*, *survival*, and *reflective* learning. We provide a framework for police chiefs, superintendents, and command-level police officers to examine how intelligence analysts learn and what effect learning has on the intelligence produced. Recommendations are made to help managers interact with analysts to better understand the conditions by which analysts are constrained and/or advantaged, and to help redesign an analyst's learning conditions to align with the kind of knowledge needed for law enforcement decision-making.

Keywords: overload, equivocality, ambiguity, learning, knowledge production.

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Introduction

We live and work in an information age. Regardless of role or function, we are increasingly susceptible to information overload—the quantity of tasks and information exceeding our ability to process—and exposure to equivocality—where multiple interpretations about the meaning of data, behavior, and communication exist, causing us to be unsure about meaning and significance—and how these effects can be a source of disruption and of ineffectiveness in what we do. By and large, it is safe to say we have come to accept these effects as a normal part of doing business because they are so prevalent, and to the extent we think about them, it is often in the search for technology solutions. We take a different approach by looking at antecedents because in the area of public safety—primarily law enforcement, but also national security—the production of knowledge used to drive and support operations is considered a key factor for success. If intelligence analysis is so important, then it behooves us to understand the antecedent effects of disruptive sources to knowledge production before we seek to find solutions; otherwise, our attempts to solve problems will very likely fail to address the underlying dynamics, resulting in the problem to persist. We therefore seek to understand how the various conditions of overload and equivocality actually affect intelligence analysts' ability to learn and create knowledge intended for operational and policy decision-making.

We are particularly interested in the law enforcement intelligence analyst career field because when compared to the long-standing military and national security intelligence analyst career fields focused on threats abroad, the modern law enforcement intelligence analyst—which we define as the era triggered by the terrorist attacks on American soil in 2001—is the “new kid on the block.” Organized military intelligence using support staffs has a tradition spanning from the American Civil War era, and national security intelligence was formalized following the end of World War II with the National Security Act of 1947. Yet, the existence of threats domestically has become as serious and consequent as almost any foreign-initiated threat. We can see evidence of the domestic threat in cyber attacks and homegrown violent extremism. These types of threats not only can have an immediate effect on the well-being and lives of the public, but such threats can have even more serious second and third order effects such as an economic meltdown and resource scarcity.

Law enforcement intelligence analysts' behind-the-scenes knowledge production activity—the techniques they use in compensating for factors such as overload and equivocality while they interpret and give meaning to information—is largely unknown to public safety managers such as police chiefs, principal investigators, and senior prosecutors, yet these factors have an effect on the knowledge produced and, by implication, the quality of the decisions made by the public safety manager. This is not to say that intelligence analysts provide faulty knowledge to managers. But it does mean that unless managers are aware of how intelligence analysts see new patterns in the environment and gain new insights—how the analyst learns while overcoming overload and equivocality—the quality of knowledge created by them may go unevaluated and subsequent interpretations and decisions by managers could produce less than desirable results for the public.

What we found in our study was that overload and equivocality affect the way law enforcement intelligence analysts learn. When an intelligence analyst only experiences low overload and equivocality, he or she uses *cooperative learning* to co-create knowledge

with their decision maker, establishing common ground and shared insights. When an intelligence analyst experiences high overload but low equivocality, he or she uses *focused learning* to effectively reduce overload and concentrate on exploiting their expertise, and tapping into peer networks to fill knowledge gaps. When intelligence analysts experience both high overload and equivocality, they use *survival learning* to immediately reach for what they know at hand to satisfy task requirements. And when intelligence analysts experience low overload but high equivocality, they use *reflective learning* to creatively solve complex, wicked problems. Each of these learning archetypes then shapes how knowledge is created.

Why a Concern about Overload and Equivocality?

In any knowledge intensive organization, senior executives and managers rely on employee knowledge for their decision-making. While employees have access to detailed, yet diverse and complex knowledge, two key informational-related factors greatly influence the employee's efforts to respond to informational needs. One factor is the degree to which the employee feels overwhelmed by the quantity of information—information overload—as work is accomplished. This is a common problem in today's information age; if there is too much information to deal with, some gets ignored or glossed over, or not interpreted fully. For example, the United States Army recently completed a study of the amount of mandatory training required by army officers and found that officers were deluged with training requirements. The amount of training exceeded the amount of time available to do the training. Therefore, they were unable to complete all training requirements, yet reported to their leadership they had indeed completed the requirements (Wong & Gerras, 2015). For the United States Army, the assumption that officers are now trained in certain skills is no longer valid because of overload, which raises the question of the organization's moral and mission effectiveness. The other factor is the degree of equivocality experienced in the work. The space shuttle Columbia disaster of 2003 is an example of how equivocality can cause catastrophic problems with unresolved multiple interpretations, in this case, the failure in determining the meaning of the blurred puff of smoke near the wing as the shuttle lifted off its launch pad (Weick, 2005).

Not all organizational activities have such severe consequences as these two examples. But these types of overload and equivocality situations—especially when both occur at the same time—do affect how and what we know; this is a cause for concern to managers and for their organizational decision-making. In public safety organizations, as well as those in military and national security intelligence arenas, the potential for both overload and equivocality to occur simultaneously is quite common (Holden, 2011; Ratcliffe & Walden, 2010). The consequences for the failure to produce accurate intelligence can have much more severe consequences than the two examples provided above, potentially affecting large segments of the population.

What We Know

How individuals learn affects what knowledge is produced (March, 1991). We generally know that individuals learn in one of two ways: they either accumulate more knowledge, reinforcing or accommodating their existing mental model, or they assimilate new knowledge by challenging their previous assumptions thereby changing their mental model (Piaget, 1954). In complex, knowledge-intensive organizations such as public safety where

identification of new trends and patterns are important, it is the latter type of learning that is most valuable to intelligence analysts and to public safety decision makers. Managers may prefer this latter type of individual learning because when it takes place, even though less predictable, organizational improvement can be expected; however, organizations benefit from the former as well because exploiting what individuals do consistently well maintains predictable outcomes (Edmondson & Moingeon, 1998; March, 1991).

Important team-level insights come from studies on trust, dialogue and shared meaning. For trust, the more members trust each other, the greater the team learning (Wu, Hsu, & Yeh, 2007), and without trust, members rely on outsiders for knowledge (Edmondson, 1999). For dialogue, teams benefit when members talk with each other (Joshi, Sarker, & Sarker, 2007; Majchrzak, Beath, Lim, & Chin, 2005). For shared meaning, analogical reasoning, mentoring and storytelling promote knowledge sharing and creation (Loewenstein, Thompson, & Gentner, 2003; Swap, Leonard, Shields, & Abrams, 2001).

At the organizational level, barriers to learning can prevent the sharing of best practices from increasing an organization's knowledge. These barriers include poor relationships between the source and recipient groups, low absorptive capacity—the inability to understand new knowledge—by the recipient group, and the recipient group's lack of understanding of how the best practice applies to their work (Szulanski, 1996). On the other hand, organizations experience the benefits of learning when people frequently communicate, groups have similar contexts, and when an experienced member or team actively works with an inexperienced team (Argote, 1999).

Rarely, however, has research focused on knowledge production by studying the interaction between employee and manager. Anytime two people interact with each other, each person's behavior affects the other, creating patterns of interaction called feedback loops (Watzlawick, Beavin, & Jackson, 1967). Positive loops change the interaction usually because both members benefit, whereas negative loops stabilize the interaction preventing further disruption usually due to perceived or actual harmful behavior. In other words, positive feedback changes the status quo, whereas negative feedback maintains the status quo. Few researchers have studied how individuals use positive feedback loops, specifically, social interaction mechanisms—social networking and dialogue—to improve learning (Hansen, Nohria, & Tierney, 1999).

Lastly, two critical factors—overload and equivocality—influence information interpretation that then influence organizational learning (Daft & Huber, 1987). Researchers have studied overload or equivocality but, surprisingly, rarely at the same time and rarely when they affect each other (Daft & Macintosh, 1981). We know virtually nothing about what happens to a knowledge producer such as an intelligence analyst when these two factors are combined. Next, we discuss the research approach to fill these gaps, the findings from the survey and interviews, then recommendations for law enforcement managers, followed by contributions to management theory, and ending briefly with limitations and concluding comments.

Research Approach

To address this shortfall, we first ask, “To what extent does a law enforcement intelligence analyst learn under different conditions in which they personally experience overload and equivocality?” After discovering different learning types exist, we then ask, “Why are the

effects so different for these analysts acting in a similar role, engaging in similar types of knowledge production under different conditions of overload and equivocality?” We use a quantitative survey-based study to answer the first question, and a qualitative interview-based study to answer the second. The studies consider how information overload and equivocality affect certain behaviors employed during knowledge production activities from task assignment to knowledge delivery.

The overall research approach we used is a mixed method embedded sequential design (Creswell & Plano Clark, 2011). We used this design because results from the quantitative study raised new questions requiring a follow-up qualitative study. The quantitative study was supplemental to the priority we placed in the qualitative study. The quantitative study used a structural equation model consisting of overload and equivocality as moderators. A four-variable direct model tested the interaction of these two moderators against three behavioral mechanisms (filtering, dialogue and networking) and their simultaneous effects on individual analyst learning. Four interaction conditions were tested: low overload / low equivocality; high overload / low equivocality; high overload / high equivocality, and low overload / high equivocality. Because the quantitative study was exploratory, no formal hypotheses were stated. Based on past theorizing (Daft & Huber, 1987), it was expected that each mechanism would have an effect on at least one of the four conditions, and the effects of behavioral mechanisms would be different for each condition.

Information overload is defined as the potential quantity or volume of information that needs to be rendered, while equivocality is about the level of ambiguity concerning the meaning of the information, as in having multiple interpretations (Daft & Macintosh, 1981). Uncertainty is related to equivocality but is very different and not included in our study: uncertainty is a lack of understanding that can be reduced by discovering facts about the world whereas equivocality, with its multiple interpretations, must be reduced by inventing or imaging meaning (March, 1994). Filtering is the decision an individual makes to delay or prioritize the processing of information. Dialogue is the individual’s inquiry to the manager to gain insights into the decision-maker’s knowledge needs. Networking is an individual’s reaching out to peers for task-related knowledge not in the possession of the individual.

For the quantitative study, we surveyed American and Canadian law enforcement intelligence analysts who belong to the International Association of Law Enforcement Intelligence Analysts (IALEIA). Analysts belonging to the association on a daily basis respond to tasks from public safety managers and produce knowledge products for them. The study author is a member of the association and contacted the association’s board. Surveys were sent in late 2012 to all 1,451 American and Canadian members by the association, with a 33% response rate, and 364 usable surveys. The survey questions included questions about the degree to which the analyst experienced overload and equivocality.

For the qualitative study, the author re-contacted the association board to ask if survey respondents could be interviewed. Thirty-one survey respondents were interviewed in early 2013, about 7-9 from each condition of low/high overload and equivocally. Interview questions asked for examples about how respondents did their job in a typical day, and what factors they thought helped or hindered their knowledge production and interaction with managers. Table 1 shows the demographics of the quantitative and qualitative samples.

Table 1
Demographics of Quantitative and Qualitative Samples

	Category	Quantitative	Percent	Qualitative	Percent
Gender	Female	192	52.7%	17	54.8%
	Male	172	47.3%	14	45.2%
Country	USA	276	75.8%	19	61.3%
	Canada	88	24.2%	12	38.7%
Education	High School	40	11.0%	3	9%
	Associates	39	10.7%	6	19.4%
	Bachelors	174	47.8%	16	51.6%
	Masters	99	27.2%	6	19.4%
	Ph.D.	7	1.9%	0	0.0%
	Professional	5	1.4%	0	0.0%
Experience	Less 2 years	25	6.8%	2	6.5%
	2-5 years	84	23.1%	2	6.5%
	6-10 years	93	25.5%	11	35.5%
	11-15 years	68	18.7%	7	22.5%
	16-20 years	28	7.7%	3	9.7%
	21-25 years	34	9.3%	5	16.1%
	26 or more	32	8.8%	1	3.2%
Employer	Federal	111	30.5%	10	32.2%
	State/Prov	91	25.0%	6	19.4%
	City/County	123	33.8%	12	38.7%
	Other	39	10.7%	3	9.7%
Age	20-29 years	27	7.4%	1	3.2%
	30-39 years	91	25.0%	8	25.8%
	40-49 years	127	34.9%	10	32.2%
	50-59 years	90	24.7%	8	25.8%
	Over 60	29	8.0%	3	9.7%
Task Force	Yes	121	33.2%	0	0.0%
	No	213	58.5%	31	100.0%
	Other	30	8.2%	0	0.0%

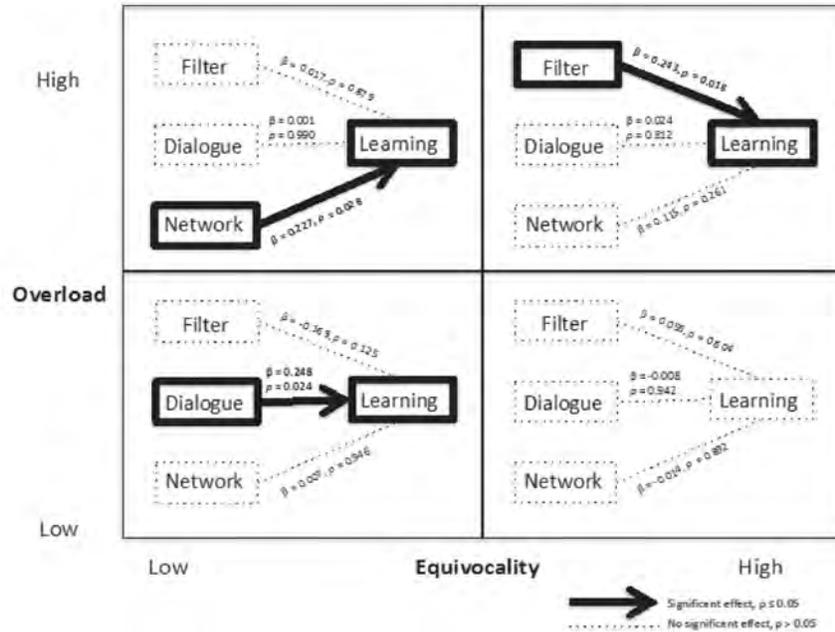
Findings

QUANTITATIVE RESULTS

The quantitative results were striking. Figure 1 shows the quantitative results for each of the four conditions. In the low overload, low equivocality condition, dialogue had the only significant effect, a positive effect on learning ($\beta = 0.248, p = 0.024$). In the high overload, low equivocality condition, networking had the only significant effect, a positive effect on

learning ($\beta = 0.227, p = 0.028$). In the high overload, high equivocality condition, filtering had the only significant effect, a positive effect on learning ($\beta = 0.243, p = 0.018$). In the low overload, high equivocality condition, there were no significant effects!

Figure 1
Key Quantitative Results



The surprising results of the quantitative study called for further explanation. To explain why there were such dramatic differences between conditions of overload and equivocality, a qualitative study was used to interview intelligence analysts who took the survey, based on the condition of overload and equivocality. However, not all intelligence analysts were considered equal for study purposes. About a third were excluded from consideration because their work environment did not share common features, which would have made isolating the effects of overload and equivocality difficult. Two groupings had significant differences: those who worked in fast-paced task forces who specialized in certain functions; and those who worked in their own organization who shared common aspects of knowledge production with others in their own organization. Three pre-study observational visits were made to a Midwestern state law enforcement organization that housed both types of groupings, which validated the need to exclude the former grouping as they exhibited significant use of specialized roles.

QUALITATIVE RESULTS

The qualitative study sought to explain why each condition was affected differently by overload and equivocality, and to explore if there were other mechanisms used by intelligence analysts that were not tested in the quantitative study. Grounded theory was used as the method of analysis (Charmaz, 2006). We found that the intelligence analysts used nine additional kinds of mechanisms to create knowledge and provide solutions to their decision-maker, in addition to the three tested in the quantitative study.

We also found that intelligence analysts used feedback patterns which were both positive and negative. A feedback pattern consisted of an analyst having a discrete, identifiable

impeding or facilitating experience, which triggered in them a sensation reacting to the experience that either caused tension or encouragement within the analyst, which then led the intelligence analyst to take action that either mitigated the impeding experience or amplified the facilitating experience. Positive feedback amplifies or changes the interaction between the intelligence analyst and the decision maker, whereas negative feedback mitigates or stabilizes their interaction. Positive feedback seeks to increase the “good” relationship whereas negative feedback seeks to decrease the “not so good” relationship from getting worst. In the qualitative study, we found 18 different types of feedback patterns in use—six positive and 12 negative—consisting of 12 mechanisms, associated with four broad categories of analyst learning, indicative of a complex relationship between analyst and decision maker, which are summarized in Table 2, and discussed below. We found positive feedback is associated with low equivocality conditions whereas negative feedback is associated with high equivocality conditions.

Table 2
Key Qualitative Results

Condition	Mechanisms Used By Analysts	Feedback Pattern Used By Analysts	How Analyst Learns	Analyst Learning Type
Low Overload/ Low Equivocality	Dialogue	Increases insight from decision maker	Receives bigger picture	Cooperative
		Increases being a team player with decision maker	Joint sensemaking increases	
High Overload/ Low Equivocality	Self-generated filter	Decreases data problems	Expertise intensely used for problem solving	Focused
	Markets to decision maker	Increases intelligence value		
	Networks with analyst peers	Increases trust by decision maker		
		Increases dependence by decision maker		
		Increases appreciation by decision maker		

Table 2 (CONTINUED)

Condition	Mechanisms Used By Analysts	Feedback Pattern Used By Analysts	How Analyst Learns	Analyst Learning Type
High Overload/ High Equivocality	Externally-generated filter	Decreases interruptions	Pays attention to what can be quickly analyzed while fending off and ignoring distractions	Survival
		Decreases workload volume		
		Decreases unclear tasks		
	Tries to change decision maker	Decreases lack of decision maker understanding		
	Tries to attain worklife balance	Decreases analyst lack of control		
Decreases analyst's unhappy feelings				
Low Overload/ High Equivocality	Reframes own worldview	Decreases separation between decision maker and analyst	Considers new possibilities	Reflective
	Mindfulness	Decreases analyst limited awareness	Self-generates bigger picture	
	Influence decision maker	Decreases decision maker limited view of data	Iterative synthesis of broadening and narrowing perspectives	
	Seeks decision maker views	Decreases single data interpretations		
	Deliberative thinking	Decreases analyst multiple interpretations		

Cooperative Learning (low overload, low equivocality). Absent the distracting effects of overload and equivocality, intelligence analysts are literally and figuratively in the presence of their law enforcement managers, allowing each to check each other's assumptions and build upon each other's viewpoints. Intelligence analysts focus their attention on manager's decision-maker needs and use dialogue with them to make knowledge needs explicit. Trust is fostered. Common ground is established (Thompson & Fine, 1999). "There is nothing better than face-to-face; you get a chance to have deep dialogue, to get to know each other," said an analyst in this overload and equivocality condition.

The insights gained through trust-based dialogue with the manager provide the analyst with the primary source of knowledge needs, reducing the need for the intelligence analyst to fill knowledge gaps elsewhere, for example, through peer networks, peers who may not have the same trust-based relationship with the manager. Under this condition, the manager welcomes knowledge production from analysts. The more knowledge provided, the more the manager trusts and depends upon the analyst, and better the analyst performs.

An analyst said, “We evaluated options openly and together. When [the decision maker] challenged me, I would provide data.” This positive cycle feeds upon each other’s confirmatory behaviors, each learning from each other over time.

The analyst’s individual learning takes place because managers provide insights about the world beyond the context of the analyst’s awareness, expanding the analyst’s ability to interpret information and produce knowledge. Similarly, the manager gets the benefit of more relevant knowledge and gets a deeper insight into the inner workings of analyst knowledge production. For the everyday working environment where analysts and managers need to work together, this type of learning is optimal. An analyst commented on how this relationship helped making sense of the data, “To put together the pieces of the puzzle so [the decision maker] can take a case to trial. We work as a team. We each have a piece of the puzzle. We work together.”

Focused Learning (high overload, low equivocality). Absent the distraction of equivocality, the clarity of context and information allows the intelligence analyst to focus attention on exploiting their specialized skills to produce knowledge. Trust and dependence are imbued by the manager, helping to secure some level of common ground with the analyst, the analyst then creating more knowledge, motivating the analyst to focus on overload reduction and attention to knowledge production.

The manager benefits from this knowledge, thus seeking more, and creating a positive feedback cycle with the analyst. The demand for more knowledge motivates the analyst to produce more. However, producing more knowledge unintentionally contributes to increasing the analyst’s overload. In addition, the increased demand by managers generates a growing diversity of knowledge demands, beyond the breadth of the analyst’s current knowledge. The analyst compensates by networking with peers to fill knowledge gaps instead of spending their own time trying to expand their area of expertise; rather, they pursue and exploit their own expertise: “I talk with the other analyst in my unit. He is an organized crime expert who is more general than me so that is helpful at times to get the broader context.”

The analyst compensates for overload by successfully controlling their own work efforts in order to complete tasks on time. This negative feedback reduces the analyst’s opportunity and motivation to use dialogue with the manager. What the analyst ends up with, because of the loss of dialogue with the manager, is reduced breadth of a greater view of the world. On the other hand, the analyst gains in knowledge depth because of efforts at overload reduction, which reduce their span of attention in order to focus on those knowledge areas for which they have expertise: “There is a very unique way of looking at data. I know the data and what the data means. It’s how my brain works, the way I pull the data and build customized reports.”

Individual learning in the intelligence analyst takes place by self-generating and self-correcting overload reducing efforts allowing the analyst to be thorough and in-depth in knowledge production, and ensuring new knowledge outside of one’s expertise is acquired through tapping into peer networks. The ability to concentrate effort is a key feature in this condition, “I was able to model the [energy infrastructure] in a way that had never been modeled. This [infrastructure] is usually determined to be vulnerable by one particular

method, nothing else, but that particular vulnerability would never happen. There are other components that could be attacked by terrorists and cause different types of failures. Now responders can train in a more realistic way.”

Survival Learning (high overload, high equivocality). The intelligence analyst fights for time—never really winning—to focus on knowledge production by fending off distractions beyond their control, such as this analyst who said, “You get assigned a task that should take 2-3 days if I was able to spend my time on just that project. But you get called off on other tasks. Then you forget where you were on the first project and you waste time figuring out where you were or you redo something you did and what should have taken 2-3 days ends up taking 2-3 weeks.” The challenge becomes how to prioritize their attention and what distraction reduction mechanisms to employ. Priority is given to negative feedback to reduce overload since sources of overload are easier to detect and compensations are easier to deploy, and achieve quicker results. The primary reduction method is “excluding”—i.e., filtering out—information and tasks to reduce or stop the overload: “You have to have time management. You are constantly prioritizing, looking at the calendar, I mean, even looking every 30 minutes to see where you are.”

Dealing with equivocality alone is difficult enough for analysts because isolating the source and controlling the clarification are challenges but this difficulty is compounded when combined with the presence of overload. What the intelligence analyst does is focus on overload reduction and selectively attempts to identify equivocality-producing sources. However, this leads to ignoring a significant portion of equivocality beyond the analyst’s control thus creating blind spots that, in turn, increase the potential disruptive effects of equivocality. “We are civilians, we are not trained to be exposed to this like the police are. I see extremely violent things happen, the worst in people. You wonder at the end of the day, like I have gotten in my car to go home and had to stop along the road and throw up.” The reason equivocality increases is that the analyst’s reduction efforts do not target the source of equivocality, because most of the attention is spent in overload reduction, all the while trying to complete knowledge production tasks. Equivocality reduction in this condition is largely about delay and deferral to avoid the disruptive experience of equivocality, not clarify it.

Compounding an analyst’s attempt at equivocality reduction is that the manager’s different way of looking at data sources used for knowledge comes to the foreground. Analysts and their managers differ in their worldview—epistemologically—about the role and value of what knowledge is and what is important. This analyst refers to this difference, “The detective did not understand how much I could do. He was looking at the database, just row by row. He did not see the information as individual data elements. He did not see the possibilities. He wasn’t reluctant to give me access because of a lack of trust. It was nothing like that. He knew me and I have the right security clearances. What it was was he did not understand that I could look at the information differently from him. He was thinking, ‘what good would it do for me looking at the same information that he is looking at?’ But that was just it, he couldn’t see that the information could be looked at differently.” Law enforcement intelligence analysts are individuals who typically value numerical, text, image or video data whereas their policing managers are individuals who live in a world of organizational politics and relationship management, and therefore value interpersonal

interaction as a source of knowledge. This difference makes it difficult to achieve common ground—managers and intelligence analysts are not able to share the same understanding and meaning of words used and contexts experienced.

Knowledge production efforts, under this condition, force analysts to make their problem-solving choices in a thought and action constrained environment resulting in their work-related energy spent finding ways to bypass obstacles, thereby often reducing methodological and analytical rigor, to find the fastest way to solve problems. The individual learning that does take place occurs as a reactive and short-term focus, where the analyst brings to the forefront knowledge resident inside himself or herself to apply within the perceived adverse experience at hand.

Reflective Learning (low overload, high ambiguity). Because of the limited amount of overload, intelligence analysts have time to ponder the root causes of equivocality, largely by introspection, and then, by negative feedback, identify and employ equivocality reduction mechanisms. Analysts realize it is futile to change the manager's relationship-based view of knowledge, though they must try. Analysts primarily resolve or reduce the equivocality by expanding their worldview so as to reduce the gap between themselves and manager in an attempt to establish common ground. Analysts do this in two ways. One way is they imagine a new context more like the manager's. "In the flow, I deal with [the police's different way of looking at data] by always asking myself what can be found out about a situation, how can we play with the data. I make a game so it is fun." The analyst takes time to reflect and create a broader worldview by temporarily stepping outside their mental model and reframe new possibilities, reducing the source of equivocality between worldviews. The other way is by becoming acutely more mindful of one's environment. Analysts, in this condition, can pay attention to their environment thus increasing their ability to interpret the broader context in which the manager works. Being mindful is accomplished because attention-distraction causes of overload are for the most part absent.

Individual learning for these analysts results from having the time and energy to creatively expand their thinking about the greater world around them, which allows them to envision a bigger picture. "I always run my findings against the inspector or detective. I never assume I am looking at a situation that I fully understand; it was never clear. An investigator has a skill set that is so different. They see things differently." Analysts come away with the understanding of a greater number and quality of organizational and societal factors affecting their knowledge production, and therefore provide a more relevant product for manager needs, especially complex and wicked problems.

Figure 2 summarizes the results of the qualitative study showing that effects of overload and equivocality produce four types of individual analyst learning: cooperative, focused, survival and reflective.

Figure 2
Framework for Understanding the Effects of Overload and Equivocality on Intelligence Analysts

High Overload	<p align="center">Focused Learning</p> <ul style="list-style-type: none"> - Analyst engages in thorough and in-depth analysis - Analyst is able to apply their expertise and skill; little constraint - Analyst taps into network of peers to fill knowledge gaps 	<p align="center">Survival Learning</p> <ul style="list-style-type: none"> - Analyst must quickly select knowledge already available from within themselves - Analyst must quickly decide what constitutes the minimal effort they will use to solve problems
	<p align="center">Cooperative Learning</p> <ul style="list-style-type: none"> - Decision maker provides analyst with "bigger picture" - Bigger picture provides analyst with more ways of analyzing data - Decision maker and analyst jointly interpret and co-discover 	<p align="center">Reflective Learning</p> <ul style="list-style-type: none"> - Analyst imagines new contexts, shifting assumptions - Analyst more mindful of their and manager's environment - Analyst uses creativity, optimal for solving wicked problems
Low Overload	Low Equivocality	High Equivocality

Recommendations for Law Enforcement Managers

IMPLICATIONS FOR KNOWLEDGE PRODUCTION

Police executives, senior investigators and prosecutors should consider what effects overload and equivocality have on an intelligence analyst's learning type because it affects the knowledge they produce for them, summarized in Figure 3. Under low overload, low equivocality (*cooperative learning*), the analyst is able to gain new ways of thinking by accessing the manager's perspective, which expands the breadth of knowledge from what the analyst knows, and the manager is able to understand what and how the analyst knows, which increases the breadth of the analyst's knowledge (as it does for the manager). In high overload, low equivocality (*focused learning*), the analyst concentrates on exploiting the depth of their own knowledge tapping into their expertise. Under high overload, high equivocality (*survival learning*), the analyst quickly accesses the knowledge readily accessible in memory, which is a shallow and fast way to skim one's knowledge without thinking too much about it beyond the present situation. In low overload, high equivocality (*reflective learning*), the analyst imagines new and creative ways of thinking, and accesses perspectives from managers to check new assumptions, which increases the depth and breadth of the analyst's knowledge.

Figure 3
Implications of Analyst's Contribution to Knowledge Production

	Focused Learning	Survival Learning
High Overload	Depth of knowledge exploited	Existing knowledge harvested
	Cooperative Learning	Reflective Learning
Low Overload	Breadth of knowledge expanded	Breadth & depth of knowledge increased
	Low Equivocality	High Equivocality

IMPLICATIONS FOR MANAGERS

Managers can use the framework to help understand the overload and equivocality conditions affecting how their intelligence analysts learn (Figures 2) and their approach to knowledge production (Figure 3). Managers can ask analysts where they are in terms of how overloaded they feel and/or the degree of equivocality they experience. To have such a conversation with an intelligence analyst so that honest answers are forthcoming, the manager needs to create the right environment surrounding the conversation. Specifically, this means that during the conversation, neither party feels overloaded or rushed, and clarity and transparency in intent are evidenced. Basically, this means that the manager must create low overload and low equivocality conditions such that *cooperative learning* exists. As we know from our study, in *cooperative learning*, intelligence analyst and manager are essentially equals, which is a different way of thinking about law enforcement managing from the traditional view of “superior-subordinate.” To facilitate this type of managing, the manager has the responsibility for establishing *cooperative learning* conditions for at least the duration of the conversation. The manager can learn about the quality of the analytical conclusions he or she receives from the analyst. Managers who consistently create and use *cooperative learning* conditions with their analysts will develop the awareness to potentially affect change when analyst conditions are out of alignment, thus improving the chances that what the law enforcement managers expect to be produced is actually produced. Similarly, if they do not have expectations, managers can identify the overload / equivocality factors in operation and how the analyst learns.

IMPLICATIONS FOR ORGANIZATIONAL DESIGN

The question of misalignment arises when the type of knowledge created by an analyst does not support the purpose of the decision-making, and when that happens, the manager is faced with how to correct the situation. For example, let’s say a manager wants a wicked

problem solved (Rittel & Webber, 1973). The manager asks intelligence analyst “A” who is experiencing *survival learning*, but the manager will be very disappointed because our study has shown that *survival learning* is not conducive to wicked problem-solving. The manager has really only two choices if the wicked problem has a chance of being solved: either ask analyst “B” who is experiencing *reflective learning*; or change the conditions of “A” so that *survival learning* is no longer occurring and *reflective learning* can take place. The latter can be more easily accomplished by temporarily removing “A” from the day-to-day survival condition, or keep “A” in place but modify their a portion of their day-to-day condition. To modify their work condition, the manager must carefully sequence the design changes so that first overload is dramatically reduced, then “A” would be able to perceive the level of equivocality experienced, and then the manager would have to work on helping the “A” focus on equivocality reduction efforts. Design changes, no doubt, will be a challenge to pull off but at least the manager has the knowledge of what can be done if the opportunity is created or comes about.

Contributions to Management Theory

OVERLOAD MASKS EQUIVOCALITY

We considered Daft and Huber’s (1987) theorizing of the effects from overload and equivocality; they recommended four types of organizational learning to overcome the effects of overload and equivocality on organizations writ large. Our evidence-based study revealed four types of individual learning that actually exist as a result of overload and equivocality. Daft and Huber (1987) theorized that in the most dangerous condition of high overload / high equivocality, learning required the reduction of overload and equivocality. Our study concluded that in that dangerous condition—of *survival learning*—overload must be first reduced because overload confounds equivocality, thereby making the sources and effects of equivocality hidden to the individual, leading to potentially catastrophic situations. Reducing overload first allows equivocality to be brought to the foreground so that it can be understood and reduced. Sequencing is incredibly important.

DIALOGUE, NETWORKING AND FILTERING ARE CONTEXT DEPENDENT

Dialogue is well known to be a critical requirement for employees and organizations to learn (Hansen et al., 1999). In particular, when faced with equivocality, dialogue is an especially important method for overcoming equivocality’s negative effects (Daft & Lengel, 1986). Our study agrees that dialogue is a very important ingredient for learning but is only effective in the presence of low overload and low equivocality (*cooperative learning*). Dialogue would be especially helpful in the presence of high overload and high equivocality (*survival learning*) but because overload confounds equivocality, the desirable outcome of clarification from dialogue cannot be achieved. Networking with peers is also well known in helping organizations learn (Hansen et al., 1999). Our study agrees but only found its use in high overload and low equivocality (*focused learning*) where the individual’s motivation for filling knowledge gaps exists. Networking in low overload and high equivocality conditions (*reflective learning*), which would seem very helpful, is not used because the lack of clarity in what knowledge is needed dampens the employee’s motivation to reach out. Filtering has long been known to be a helpful technique for reducing overload (Miller, 1960). However, when overload is not present the converse has not, to our knowledge, been shown empirically. In the quantitative portion of the study, under low overload and

low equivocality conditions (*cooperative learning*) filtering approached negative significance ($\beta = -0.169, p = 0.125$), which means that filtering, if used, would then be detrimental to analyst learning. Context is incredibly important: dialogue, networking and filtering are very helpful in some conditions but not helpful in others.

ENABLERS OF ORGANIZATIONAL FLEXIBILITY

At the organizational level, we know that the tension between exploitation and innovation can be a constant source of stress for managers (March, 1991). Do we focus on what we know, or do we create new products and services? Organizational structures tend to promote one or the other but it is very desirable to have the ambidexterity to do both. Both passion and discipline are considered necessary drivers for individual employees to support organizational ambidexterity (Andriopoulos & Lewis, 2009). From our study, we know low overload conditions expand the variety and breadth of knowledge but it is only when such a condition is combined with low equivocality (*cooperative learning*) do analysts engage in positive feedback loops with others, thus reinforcing the analyst's passion needed in explorative behaviors. Our study shows high overload conditions dissuade analysts from seeking breadth of knowledge and promote the narrowing of their knowledge attention, and it is only when such a condition is combined with low equivocality (*focused learning*) do analysts engage in positive feedback loops promoting control of their problem-solving efforts thus reinforcing the discipline needed in exploitative behavior. Organizational ambidexterity, therefore, is enabled by *cooperative* and *focused learning*—characterized by the presence of clarity—and obstructed by *survival* and *reflective learning*—characterized by the experience of equivocality.

Limitations

The study makes no attempt to estimate the distribution of analysts experiencing the four types of individual learning amongst law enforcement analysts in the United States or Canada. A future study would be required to address such an assessment. In terms of generalizability to analysts beyond law enforcement, one could reasonably infer the effects of overload and equivocality at the individual unit of analysis—where the individual analyst is the focal point—on learning and knowledge production would equally apply to individuals who are military intelligence analysts, national security intelligence analysts and competitive intelligence analysts. Certainly, at the organizational unit of analysis, law enforcement and national security cultures are different (Carter, 2012).

Conclusions

Intelligence analysts experience overload and equivocality to varying degrees. How they experience these factors affect how they learn, which then influences the knowledge they produce for law enforcement managers. However, each learning archetype has advantages and disadvantages. For *cooperative learning*, while intelligence analyst and manager benefit from co-discovery and common ground, the analyst may not be particularly reflective since the absence of equivocality inhibits the motivation for reflection. For *focused learning*, the benefits of deep and thorough data analysis can be offset by not being particularly innovative. For *survival learning*, the advantages of excelling in chaotic environments by acting and thinking quickly risks the absence of reflection and the lack of awareness of the realities of equivocality in organizational settings. For *reflective learning*, the benefits of reflective thinking and creative problem solving may be outweighed by slowness in

response, by disdain for routines, and possible lack in fully appreciating external constraints. Learning types, therefore, become a critical organizational lever that managers can use to optimize knowledge coming to them depending on the reason why knowledge is needed.

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 Ph.D. 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.

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