Rethinking Analytic Disciplines, Reordering the Profession

J. Eli Margolis

Introduction[1]

The future of intelligence analysis appears daunting. The profession seems to face in the years ahead more data of less reliability, greater competition from multiplying outside voices, an ever-quickening pace of operations, and increasingly complex analytic tools.

And yet, as Joseph Gartin noted in his article in *Studies* in June 2019,[a] the basic nature of analysis is likely to remain the same. Amid disruption, officers still make sense of the world by "reading stuff [and] writing stuff." He writes that "knowing where we started is key to charting the future."[2]

This article follows Gartin's lead in seeking continuity between the old and the new. It goes "back to the future," revisiting old concepts to sketch a way forward for the profession. Specifically, it applies typological methods to strengthen old analytic categories. The disciplines that result open new ways to order theory, warning, discourse, doctrine, education, evaluation, and technology in the years to come.

From taxonomies of craft . . .

The Intelligence Community for decades has drawn on a wide range of organizing principles to classify analysis through type distinctions. Variously, it has conceptualized analysis by region (e.g., Asia, Africa), theme (often termed "functional," e.g., biographic, economic, scientific), scope (e.g., strategic, tactical), timescale (e.g., current, long-range), practice (e.g., descriptive, predictive), purpose (e.g., inform, warn), and complexity (e.g., linear, nonlinear). Other categories have reflected organizational divisions (e.g., national, departmental), nature of sources (e.g., single-source, all-source), collection method (e.g., SIGINT, HUMINT, OSINT), analytic method (e.g.,

qualitative, quantitative), or bureaucratic posture (e.g., detached, close support).[3]

Two models that integrate and order attributes created by the above principles have come to dominate thinking in this area. In the following, I offer basic descriptions of each, which I label "traditional" and "contemporary." These models are taxonomies of craft, intuitive rather than structured.

The traditional taxonomy is pragmatic and groups together distinctions in scope, timescale, practice, and purpose that often align in day-to-day work. In 1949, Sherman Kent identified three families of analysis: basic-descriptive, current-reportorial, and speculative-estimative.[4] The rapidly evolving CIA soon mirrored these three approaches in its organization. By 1951, the agency's primary analytic office had been divided into the Office of Research and Reports, which handled basic research; the Office of Current Intelligence, which assessed new developments; and the Office of National Estimates, which addressed particularly challenging and prospective issues.[5]

Today, the common understanding of each type remains largely unchanged, even as the community has since appended a fourth type, warning analysis, and periodically reevaluated the structure. Basic analysis or research has become "foundational analysis" but still focuses on facts. Current analysis remains urgent, evaluative, and policy-relevant. Estimative analysis, though less dominant today than in Kent's time, still carries its original branding as farsighted and strategic. Warning analysis has survived considerable debate conceptually intact as, at its core, a direct communication of threat.

The contemporary taxonomy is conceptually bolder. It reflects both advances in related academic fields and

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lessons learned from decades of experience and experimentation. It creates three analytic types by grouping distinctions in scope, timescale, and complexity. In both 2014 and 2019, the *National Intelligence Strategy* defined these types as strategic, current-operational, and anticipatory.[6]

These types are defined only loosely in authoritative guidance. Strategic analysis focuses on "deep understanding" within a broad, deliberative orientation attuned to policy development. Conversely, current-operational analysis is narrow, timely, and tailored for policy implementation. Anticipatory analysis stands apart, reserved for foresight of emerging issues or discontinuities amid high uncertainty.

Neither model meets the criteria of a successful typology.[7] Specifically, a typology should

- organize by the most meaningful attributes,

- apply those principles consistently,

- contain mutually exclusive types that collectively exhaust all possibilities, and

- be as simple as possible.

In particular, both taxonomies fail to apply organizing principles uniformly, denying the resulting frameworks internal consistency and completeness. They lack strict defining distinctions. Instead, they are constituted by clusters of attributes with uneven salience. For example, the traditional model defines current

analysis largely by timescale; basic, by practice; and warning, by purpose. The contemporary system defines strategic analysis predominantly by scope, but anticipatory analysis by complexity.

This shortcoming prevents mutual exclusivity and invites blending. Can a line of current analysis keep an estimative outlook and include meaningful warning? Can a strategic analysis of adversary intentions also anticipate discontinuous decisions? If so, these distinctions seem closer to attributes than to fully developed types that the profession can use to prepare for the future.

… to a typology of disciplines

This section develops the more promising traditional model into a formal typology of analytic disciplines. The proposed approach relies on three related foundational commitments. It accepts that the purpose of analysis is to provide decision advantage by reducing uncertainty.[8] This presumes that uncertainty hinders clients as they work. It also assumes that uncertainty, though inevitable in theory, can be reduced by degree in practice.

The two elements most meaningful in reducing uncertainty are the two kinds of uncertainty themselves.[9] *Epistemic uncertainty* reflects incomplete knowledge; the less we know about an issue, the less certain we can be in its development. The *unknown* holds us back even when an issue is theoretically knowable. In contrast, *aleatory uncertainty* reflects natural variability; the more

inherently variable or seemingly random an issue, the greater our uncertainty in its development. Here, the *unknowable* is what limits us.

The matrix (Table 1 on the facing page) structured by these two elements, outlines four domains: defined, complicated, complex, and undefined. These are ideal types rather than categories of specific cases. They abstract useful representations by simplifying and accentuating the poles of the two continuous framework variables.

Two observations clarify the boundaries of these domains. First, some attributes align with the framework variables. For example, the degree of abstraction changes alongside epistemic uncertainty; a discrete object (e.g., new sanctions, a missile test) permits greater knowledge than an abstract one (e.g., bilateral coercion, the evolution of multilateral institutions). We may hope to know more of what can be known about a particular thing than about a concept. Similarly, timescale changes alongside aleatory uncertainty; the more prospective the object of analysis, the greater its inherent variability. There is more room for randomness in the next decade than in the next month.

Second, the placement of an object of analysis depends on its framing. What are we assessing? Generally, a narrow framing limits its uncertainty while a broad one expands it. In this way, a single dynamic in the world—say, an election—might span all of the domains, appearing in each as the question asked of it changes. The fate of today's vote could be straightforward (defined), but its impact on each party's agenda (complicated),

competitive interactions in the legislature this year (complex), and long-term development (undefined) would involve progressively greater uncertainty.

This framework defines four types of analysis: descriptive, evaluative, estimative, and exploratory (Table 2 on the next page). Each corresponds with one of the uncertainty domains. Additionally, the makeup of the matrix implies the existence of a fifth type: epistemic analysis expands our knowledge, affecting one of the two variables in the framework. Like the uncertainty domains, these are notional ideal types—deductively derived possibilities rather than an inductively recorded catalog of actual practices.

Analytic disciplines in concept

These ideal types of analysis align broadly with those in the traditional model despite the divergent foundations of the approaches.

- Epistemic analysis resembles basic research or foundational analysis;

- Descriptive and evaluative analysis seem similar to current analysis; and

- Estimative and exploratory analysis rhyme with what Kent initially called speculative analysis.

However, a number of elements distinguish the new typology and the traditional model. This new approach identifies types that the traditional model combined, seeing two kinds each of current and anticipatory analysis. It also adjusts the meaning of these familiar terms, as we will see. And it introduces insight from the contemporary model, integrating

Table 1: A Typology of Uncertainty Domains

		Aleatory Uncertainty: How naturally variable is the object of analysis?	
		Low	High
Epistemic Uncertainty: How limited is our knowledge of the object of analysis?	Low	Defined domain	Complex domain
	High	Complicated domain	Undefined domain

The **defined domain** approaches regularity. It is marked by significant knowledge about an object that is nearly predictable. In it, concepts appear ordered. Actors, capabilities, intentions, and relationships are largely understood. And change is mostly linear, the result of evident cause-and-effect relationships—an attribute that makes the past a reasonable guide to thought. This ideal is artificial, but conditions similar to it are enabled by a narrow framing of the object of analysis, particularly by issue and time—a discrete event in the present or just-past.

The **complicated domain** centers on ambiguity. It is marked by limited knowledge of a mostly steady object of analysis. Much is unknown, but the object is theoretically knowable. Patterns seem linear even as the capabilities, intentions, and relationships of actors are cloudy, requiring interpretation. Conditions similar to the complicated domain follow a broader framing of the object by issue, but not of time. It remains centered on the present or just-past.

The **complex domain** reflects indeterminacy. It is marked by a high natural variability that persists despite significant knowledge. In it, actors' capabilities and intentions seem familiar, but their interactions are obscured by contingency, emergent system effects, and discontinuities. As a result, the past, which appears linear in hindsight, is less valuable as a guide to thought. Conditions similar to the complex domain pertain when a narrowly framed object of analysis is carried into the future.

The **undefined domain** approaches true uncertainty. It is marked both by limited knowledge and high variability, attributes that severely restrict understanding despite occasional pattern stability. In this domain, nearly everything is questionable, including actors and their characteristics, constitutive analytic concepts, and presumptions about cause-and-effect relationships. Conditions similar to the undefined domain follow an expansive framing of an object of analysis in a future context.

complexity as a constitutive element of the framework.[10]

Some of the subtler changes are easier to see through examples. Table 3 draws on historical events in China to derive hypothetical intelligence questions organized into the five new types offered here. It also notes in shorthand how these issues would

be categorized by the traditional and contemporary models.

The comparison suggests that some earlier categories might be too broad—particularly current analysis, which appears in both previous taxonomies and seems to mask a wide range of distinct work. The contemporary model's framing of strategic analysis also seems underdefined,

frequently stretching across the eval-uative-estimative boundary, which is marked not by the thin line of knowl-edge (epistemic uncertainty) but by the bold one set by natural variability (aleatory uncertainty).

Analytic disciplines in practice

The proposed typology can also be clarified through a hypothetical exploration of practical demands. The below descriptions explain the five ideal analytic disciplines in such a practical context, showing each to be distinct and held together by an internally consistent logic. As before, these descriptions are notional, teas-ing out the implications of a concep-tual framework rather than recording actual practice.

Epistemic, or foundational, anal-ysis defines reality, indirectly sup-porting clients through accuracy. It works through reference products and factual responses to questions. Such references are diverse—maps, biog-raphies, and weapon system charac-teristics are all included—but share a commitment to a very high eviden-tiary standard. Here, the demands on analysts center on knowledge-build-ing and include collection, technical, and subject expertise.

Descriptive analysis enables action and policy implementation by delivering situational awareness. Its products are first-order summaries and timely updates. They stay close to the information base and do not set a broader, interpretive analytic line. As a result, they demand less of analysts than work in other analytic types. Descriptive analysis requires background knowledge, procedural rigor, and comfort with a rapid, high-stress work tempo—but not deep

Table 2: A Typology of Analytic Disciplines

Descriptive analysis reduces uncertainty by ordering and updating understand-ing in the defined domain. Here, clients might not seem to need analysis; they have available a large body of knowledge about an object that is relatively pre-dictable. But no object is static. Time and change create uncertainty everywhere. There is value in regular updates and first-order summaries, especially when clients are unable to do such work themselves. Descriptive analysis delivers the news.

Evaluative analysis reduces uncertainty in the complicated domain by filling in gaps, providing context, identifying trends, and interpreting their meaning. Clients broaden a descriptive framing through abstraction, reducing available knowledge even as the object of analysis remains relatively predictable. Analysts piece together fragments of what is known in order to extrapolate what is not. Evaluative analysis provides commentary, interpreting the news.

Estimative analysis reduces uncertainty by setting expectations in the complex domain, an area in which they do not come naturally—and in which clients can mistakenly presume predictability. Clients can struggle despite deep knowledge when an object is complex, interactive, or prone to emergent rather than linear outcomes. This is frequently the case when the object of analysis is in the future, such as a country's response to a potential action, or inherently unknowable, as with a leader's decision calculus. Estimative analysis is nearer a map; it cannot capture its object's richness, but it can provide a model defined just enough to be useful.

Exploratory analysis reduces uncertainty by bounding expectations in the un-defined domain, the most challenging of all areas, in which both knowledge and natural order seem to be absent. Clients cast their eyes over broad objects, fram-ing them ambitiously. Analysts develop concepts, order frameworks, and delineate possibilities. Exploratory analysis is a compass, enabling orientation.

Epistemic analysis reduces uncertainty by expanding knowledge, directly low-ering the framework variable of epistemic uncertainty. It establishes provisional truths—functionally, facts—through historical study of objects that are theoretically knowable. In effect, epistemic analysis provides an encyclopedia.

subject, policy, or methodological expertise.

Evaluative analysis enables critical reflection and policy develop-ment by delivering strategic aware-ness. In practice, these second-order assessments reduce uncertainties of situation, meaning, and trajectory, interpreting developments with reference to a larger context. They set the analytic line. The ideal is similar to mainstream foreign policy analysis and the work of private

Table 3: The Typology in Substantive Context

	Foundational	Current		Anticipatory	
	Epistemic	Descriptive	Evaluative	Estimative	Exploratory
E.g., Nuclear weapons in China (1960s)[11]	What is the organization of China's nuclear weapons research effort? (1, 4) What is the size and makeup of China's nuclear arsenal? (1, 4)	What device did Beijing test yesterday? (2, 4) How did the region respond? (2, 4)	How capable is the new weapon design? (2, 4) Where is Beijing's nuclear weapons program going? (3, 5)	How would Beijing respond to a strike on its nuclear program? (3, 5) What arms control schemes would interest Beijing, if any? (3, 5)	How might the proliferation of this technology affect security dynamics elsewhere? (3, 6) What is the future of deterrence in East Asia? (3, 6)
E.g., Military reforms in China (1980s)[12]	Who leads China's military? (1, 4) What is the organization of the military after reforms? (1, 4)	What changes did Beijing just announce? (2, 4) How did the first post-reform exercise go? (2, 4)	What patterns are emerging in the reform effort? (2, 5) Why is Beijing reforming its military? (2, 5)	What are the prospects of the reform effort? (3, 5) How will the Soviet Union and Vietnam respond? (3, 5)	What is the future conventional military balance between Beijing and Moscow? (3, 6) How might China's civil-military relations evolve? (3, 6)
E.g., Handover of Hong Kong (1980s-90s)[13]	What are the provisions of the Basic Law? (1, 4) What international businesses operate in Hong Kong? (1, 4)	How did the region respond to the Joint Declaration? (2, 4) How are citizens reacting to accounts of Tiananmen? (2, 4)	What are Beijing's plans for Hong Kong? (2, 4) What are Beijing's redlines? (3, 5)	How stable will the transition be? (3, 5) What could trigger the flight of international businesses—and how would it unfold? (3, 5)	What is the future of "one country, two systems?" (3, 6) How might China's posture toward the West change? (3, 6)
Traditional Framework Types 1=Basic 2=Current 3=Estimative			Contemporary Framework Types 4=Current operational 5=Strategic 6=Anticipatory		

risk assessment firms. The products are short but rich, substantive, and thoughtfully organized. Evaluative analysis requires more of analysts than descriptive work, including significant subject expertise and critical thinking abilities.

Estimative analysis enables planning and strategy development by providing a structure to thought. Its products are forecasts of well-known or well-defined issues that reduce uncertainties of interaction in order to set expectations; they do not predict events. They can be longer than evaluative pieces because they convey an approach in addition to an assessment. These products are based in—but free to move away from—the analytic line as they rethink settled judgments in future contexts dense with complexity, variability, and systems effects. Estimative analysis relies more on models and reasoning than evidence, requiring creative methodological skills—and a rare mix of analytic boldness and humility.

Exploratory analysis enables alignment and posture development by providing a broad orientation. Its products are projections—often, scenarios—that reduce uncertainty by bounding possibilities and creating a space within which clients can consider key questions. The paucity

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of both knowledge and predictability makes replicable reasoning extremely difficult; in practice, exploratory analysis often curates uncertainty as much as reduces it. These "think pieces" by necessity depend on conceptual reasoning far more than evidence, demanding of their authors a great deal of expertise, flexibility, and methodological invention.

This is where the abstract types start to become disciplines. Each takes on an identity, animated by distinct tangible expressions of a unique conceptual grounding. Both the meaning and the experience of the work shifts fundamentally from type to type; there is no single "analysis" or image of analytic success.

These differences are durable. The logic of each discipline holds even across once-dominant organizing principles, such as region, theme, or technical field. An update on a protest movement is of a piece with the latest trade figures and notice of yesterday's weapons test (all descriptive)— not a biography of an activist leader (epistemic) or assessment of the evolution of protestors' grievances (evaluative), despite the similarities in topic in the latter two products. The framing of the object of analysis is more essential than its surface attributes.

What of "Warning Analysis"?

One past organizing principle— purpose—raises a difficult question: What about warning analysis? Few subjects in the intelligence literature have inspired so much debate or seem as central to the history and identity of the analytic corps. But

warning is absent from the proposed typology. Where does warning analysis fit?[14]

The typology integrates warning, treating it as it does other non-essential, past organizing principles. Warning is an attribute within a discipline rather than a discipline of its own because it lacks a unique foundation in uncertainty. There is not one "warning"; there is a kind unique to each discipline.

The most intuitive types warn of vivid threats, such as a feared event (descriptive) or unanticipated shock (estimative).[15] Also important are larger transformations, paradigm shifts, or system changes (exploratory).[16]

Less studied are two others that the field treats as warning in all but name.

- **Epistemic warning** is the communication of threat that accompanies an alarming reassessment of basic research, as in the Air Force's mistaken discovery of bomber and missile gaps in the 1950s.

- **Trajectory warning** is a threat communication rooted in ongoing trends: "If this continues . . ." We rarely label it a warning despite its function because it is often implied, taken as obvious, or woven naturally into evaluative analysis.

Overall, the proposed typology of analytic disciplines outperforms the traditional and contemporary models when held against the same five criteria cited on page 2 at

the beginning of this article. The new model takes the variables in its framework directly from a concept of the purpose of analysis, ensuring they are meaningful. The framework itself applies these variables largely consistently and keeps the resulting types mutually exclusive and collectively exhaustive. Last, the structure as a whole is coherent and relatively simple.

The most notable exception is the use of a variable, epistemic uncertainty, on its own to structure an analytic discipline. This compromises a degree of consistency and raises questions about exclusivity; there is a degree of knowledge-building involved in each of the disciplines. The score in these areas is lower, though still comparatively improved, as a result.

Addressing potential objections

This section addresses several potential objections to the proposed typology. They are valuable and, though answered here briefly, worthy of additional debate and research.

First, a critic could advance a different purpose for intelligence, subverting our point of departure. In particular, some scholars have argued that leaders need more uncertainty, not less.[17] To them, the problem is oversimplification by close-minded, incurious, or ideological leaders. Surely, there is nothing to be gained by reducing the uncertainty of the already-certain.

This objection misreads the aim of this effort, which is deductive. The proposed typology is a model defined by ideal types of analysis. By necessity, it is set against a similarly

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ideal-typical representation of leadership. It seeks to set a model—and, as a result, norms—for our profession. And it is no use founding a profession on a presumption of bad faith or incompetence.

The objection also stops a bit too short. An extended consideration would return to a purpose of reducing uncertainty. Consider the client implied by the critic: decisive but close-minded. Strong analysis might complicate the leader's views, as suggested, but the result would be a loss of decisiveness. Analysis would have created the opposite of decision advantage. Ultimately, the task would remain reducing uncertainty—bringing the leader through the fog to arrive at the simplicity on the far side of complexity, so to speak.

Second, a skeptic might assert that the framework's variables are a muddle because there is no difference between the two types of uncertainty.[18] In this view, aleatory uncertainty is really just an extreme form of epistemic uncertainty. Things only appear random or highly variable because we know so little and our theories are so poor. And so the framework itself makes no sense.

Surprisingly, this objection is largely irrelevant for our purpose even as it remains debated among scholars. To leaders and analysts wrestling with a complex international system, the epistemic-aleatory distinction holds firm in practice. Sometimes we can narrow our framing of an issue and presume linearity. Other times, things are just too complex. The practical constraint remains the same whether it is due to inherent natural variability or radical

ignorance, making the framework valuable despite this concern.

Third, a critic might disagree with the proposed typology's reliance on the framing of the object of analysis to determine its uncertainty domain. He or she might assert that uncertainty is a feature of the world. Some objects are more complex than others in themselves, regardless of how we see them. Uncertainty is objective, not something we construct. Uncertainty is not what we make of it.

This objection attacks a straw man. The approach accepts that events in themselves can raise or lower an observer's uncertainty. A military exercise is less uncertain than the course of a pandemic, for example. There is a basic difference inherent in the nature of each event; the former is closed, defined by command, order, and timespan, while the latter is open, characterized by emergence and discontinuity.

To recognize that, beyond an event, the perspective of the observer also matters accepts (not constructs) reality. For example, the notional military exercise would be less uncertain to a participating officer than an uninvolved soldier in a distant garrison. Our perspectives and questions shape our uncertainty, making the framing of the object of analysis a critical variable—one which it would be more disruptive to exclude than to incorporate.[19]

Last, a reader could protest the absence of prediction, the standard by which analysis is often judged. Scholars have used prediction to evaluate

expert political judgment.[20] Policymakers looking back on surprises like the Arab Spring lament the lack of prediction. And the Intelligence Community itself has poured a great deal of effort into innovating predictive analytic techniques.[21] Where is it?

The typology approaches prediction cautiously.[22] It accepts forecasting—a very soft form of prediction—in estimative analysis, which "sets expectations" about (rather than predicts) system dynamics, actor interactions, and event pathways. The approach does not admit probabilistic judgments about discrete events because they violate its foundational commitment to aleatory uncertainty. Beyond that, the typology rules out a hard form of prediction categorically. The framework explores forms of uncertainty; there is no place for strong, singular—certain—claims about the future.

A pathway to profession

What do these disciplines mean for the community? Conceptually, they open new ways to advance longstanding debates over theory and warning. Practically, they suggest opportunities to adjust discourse, doctrine, education, certification, and self-evaluation. Finally, they suggest a model for integrating new technology, including big-data, artificial intelligence, and machine learning tools.

Sharpening theory

The proposed typology develops intelligence theory by clarifying concepts and mechanisms within a leading approach. Specifically, it advances adaptive realism by

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defining the ways in which analysis produces decision advantage.

Adaptive realism casts intelligence as an instrument of competition in the anarchic world of realism.[23] Unable to rely on order, states face pressures to accrue power. States undertake intelligence activities in pursuit of decision advantage, a kind of power created by enhancing one's own awareness while degrading that of an adversary. In this way, uncertainty itself becomes a domain of competition.

However, adaptive realism leaves the mechanism through which analysis provides decision advantage underspecified. It treats awareness—or "anticipation" in the foundational text—as a natural result of research, pattern recognition, and case interpretation: analysis leads to anticipation, which in turn leads to decision advantage. But neither link is automatic. The question remains: How does analysis work?

The proposed typology suggests an answer by recasting the disciplines as explanatory pathways. Analysis provides decision advantage by reducing uncertainty in five ways: these include expanding knowledge, reporting events, interpreting events, setting expectations, and bounding expectations. The ideal-typical model can inform new hypotheses and tests of how analysis works.

The model also creates new possibilities for strategy in the theory because it suggests each discipline carries distinct strengths and weaknesses. For example, a state might

seek advantage through *agility* in action and policy development, prioritizing current analysis. It might pursue *prudence* through the strategy and posture decisions enabled by anticipatory analysis. Or, absent that, it might offensively stoke uncertainty by disrupting those activities in its adversaries—a strategy some observers credit to North Korea.

With more room for strategy, the theory becomes richer. It suggests ways particular environments might shape intelligence activity. This view expects a state at risk and frequently managing crises, such as Israel or South Korea, to prioritize current analysis amid scarce resources, for example. Conversely, it expects a relatively secure state like the United States to invest more in anticipatory analysis. Additionally, this turn in the theory adds texture to explanations of intelligence sharing by suggesting ways states might choose to complement one another. States with an advantage in one discipline might be drawn to those with an advantage in another.

Clarifying warning

The proposed typology also contributes to the community's exploration of warning by rethinking the nature of the field. Specifically, it recasts warning as embedded in other disciplines and steps away from prediction.

First, the approach redefines the field: warning is an activity within all disciplines rather than a discipline in its own right because it lacks a unique grounding in uncertainty. Warning

practices share more with their disciplines than with one another.

Consider two high-profile warning practices: traditional indications and warning (I&W) and more recent quantitative models such as that of the Political Instability Task Force (PITF). An indicator list for a possible attack by an adversary takes as its focus discrete activities, which it monitors in order to update situational awareness.[24] This is descriptive work (updates) that centers on events (defined domain)—albeit structured in a sophisticated way. Similarly, a model of state collapse focuses on unknown discontinuities, which it sketches in order to set expectations within a framework.[25] This is estimative work (framework) centered on nonlinear developments (complex domain). These practices, strangers to one another, are familiar to others within their disciplines.

To warning advocates this might at first look like an affront—the subordination of a rich tradition in service of the uniformity of a framework. But with reflection, advocates might also see victory. The integration of warning within analytic disciplines is an embrace of the field—an identification of it as an integral, ubiquitous, and shared responsibility. Simultaneously, it remains set apart. Here, we can say that "every analyst is a warning analyst" and understand it to signal the preservation rather than dissolution of warning practices.[26]

In a way, the typology's reconceptualization even expands the field by inviting it into new areas. The approach identifies new forms of warning analysis. Epistemic warning alerts clients to threats caused by a

reevaluation of knowledge—something done frequently but never named. Trajectory warning alerts clients to threats within linear projections. Each of these can be developed as subfields within the warning family.

Second, the typology draws back from warning-as-prediction because it embraces uncertainty. It works with a broad concept of warning as a direct communication of threat. It avoids the narrow view that warning should involve probabilistic event predictions. To the framework, such predictions are unsupportable shortcuts to certainty that bypass the complexity of reality.[27]

The framework also raises a pragmatic objection. Probabilistic event prediction is often not very useful because it does not help clients with the bulk of their work, the full range of which is highlighted by this typology. Should the community assign odds to the likelihood an adversary will attack, a client would still ask us to check our facts (epistemic), track military movements (descriptive), identify possible aims given the strategic context (evaluative), forecast the most likely main effort and concept of operation (estimative), and sketch dynamics shaping a post-conflict order (exploratory). There are actions to take, policies to develop, plans to make, and realignments to get underway—almost none of which depend on an analyst's guess of a 30- or 60-percent chance.

This conclusion is less disruptive than it appears. It does not constrain research, experimentation, or development of methods—all of which are meant to push the boundaries of uncertainty. Nor does it prevent the use of historical base rates, model forecasts, or a source's predictions as forms of evidence. Instead, it softens claims about the future in judgments, working within the constraints of uncertainty rather than ignoring them.

Raising the discourse

More practically, the proposed typology presents an opportunity to change how we talk about analysis. Its implications are challenging and occasionally pointed. Specifically, the approach suggests a discourse that dethrones evaluative analysis, defends epistemic analysis, and devalues some past organizing principles.

First, the typology asserts boundaries that "right size" evaluative analysis, ending the community's habit of giving the discipline a normative role in our discourse. Over time, "analysis" without an adjective has come to mean evaluative analysis, universalizing a set of ideas that are in fact specific to one discipline among many. We presume "analysis" involves interpretation that sets an analytic line cast in the present to support policymakers—all attributes that the typology shows are limited only to a specific domain.

This habit is harmful because it encourages us to hold diverse work to a single standard. In this light, descriptive analysis looks thin and underdeveloped. Estimative analysis appears too bold, drawing misplaced criticism. And exploratory analysis seems like outright conjecture.

The typology gives us a chance to update this view with a more precise discourse informed by disciplines.

We can change how we talk about our work in everyday conversation, product coordination, intelligence scholarship, and even doctrine to reflect the basic distinctions between analytic types, guarding against pressures to enforce a single standard.

Such a change legitimizes epistemic analysis in particular—the second way the typology raises the discourse. The community has come to view the discipline as somehow subordinate to other forms of analysis, taking as given that it provides facts but falls short of interpreting them. This is a mistake; the building of knowledge is a monumental effort, both distinct from and equal to other types of analysis.

Third, the typology also challenges a range of past organizing principles as irrelevant. For example, the ways we reduce uncertainty do not change by region (e.g., Asia, Africa) or theme (e.g., political, economic). We can stop speaking about these groups as distinct analytic disciplines.

However, a withdrawal from casual "disciplines" does not imply a rejection of tailored support. Groupings like "defense intelligence" or "East Asia analysis" are unsupported as disciplines, but might be helpful as principles for institutional organization, budgeting, oversight, branding, or other non-analytic activities beyond the scope of this article.

Formalizing specialization

The proposed typology enables specialization, a hallmark of professions. Specifically, it creates opportunities to improve doctrine, education,

and certification by moving each beyond a default embrace of evaluative analysis to encompass the full range of disciplines.

The central idea is to hold each discipline to its own standard. One size does not fit all in the work of analysis. There is no one way to "connect the dots." Each discipline has its own domain, supported function, and associated skills and practices. An embrace of these distinctions through specialization both corrects a past imbalance in the profession and creates new opportunities for innovation.

First, the community might revisit doctrine. At a basic level, it could revise ICD 203 "Analytic Standards" and JP 2.0 "Joint Intelligence" to acknowledge unique aspects of each discipline and to discourage the evaluation of products of one type by the standards of another. Separately, analysts might group, tailor, or develop structured analytic techniques for each discipline—testing and validating them with reference to a discipline's standards, not a generic conception of analysis. In the future, the community could even issue a series of expositions comparable to the military's joint publications, with a slim volume tracing the purpose, history, and practices of each discipline.[28]

Second, we might reconsider education and certification. Initial entry-on-duty training could introduce the basics of each discipline. Specialized courses and certification could follow, starting perhaps with an entry-level accreditation program for descriptive analysis. And the National Intelligence University could lead advanced education and certification, such as a credential in estimative or exploratory analysis.

More generally, the disciplines might order and sequence education. They can be interpreted as a path of development moving from less uncertainty to more uncertainty, nurturing unique analytic competencies along the way (page 2). Such a sequence would expose new analysts in an ordered way to the diversity of analytic work so that they entered into "full performance" grades capable in each discipline.

Enabling evaluation

The proposed typology also unlocks a promising new approach to self-evaluation. It takes advantage of each discipline's distinct supported functions to create two useful standards for analytic products: sufficiency and indispensability.

Self-evaluation is an old quest in the IC; observers have long sought to grade analytic performance but struggled to find the appropriate measures. The most common benchmarks—accuracy, prediction (preventing surprise), and usefulness—are problematic in practice.[29] Notably, they also presume a uniform application across all kinds of analytic work.

The proposed typology enables a tailored standard of usefulness that ties a product to its discipline's supported function. What is the purpose of that discipline? An evaluator with hindsight could look back and ask if a specific product had met it. A soft test would ask if a product had been sufficient: Would a reasonable client based on the work have been prepared to fulfill his or her duties? A hard test would ask if a product had been indispensable: Would that client have been unprepared without it?

Consider the *President's Daily Brief* (*PDB*), a canonical product

line.[30] The *PDB* is nearest the evaluative ideal type, providing strategic awareness (purpose) to facilitate policy development (supported function) for a small group of top officials. An officer evaluating a *PDB* article might ask: Did the analysis foster "good enough" strategic awareness to support related policies? Would those policies have drifted or been undermined without it?

The same tests of sufficiency and indispensability might be applied to high-profile product lines in other disciplines. The NIE is nearest the estimative ideal type, setting expectations (purpose) to enable planning and strategy development (supported function).[31] Here, an evaluator might ask: Did the analysis set "good enough" expectations to support a related strategy? Would that strategy have been lost without it?

Such a discipline-based approach to evaluation breaks from past models in two ways. First, it devalues accuracy and prediction, viewing them only as one of many attributes that could contribute to sufficiency and indispensability.[32] Second, it redefines usefulness, cueing it not to specific clients' feedback—or professional fate—but to the duties of a notional "reasonable client." This saves the community from customer service, a self-subordination anathema to profession.

Interestingly, it also highlights a way analysis can fail without any drop in quality: Demand can rise. In a crisis, for example, the pressures on policy and strategy grow, raising the corresponding analytic need. The same *PDB* or NIE that would have been sufficient yesterday might no longer be enough. Past models of

evaluation ignore this interaction, presuming a steady need that has never existed.[a]

Separately, this approach also subtly reimagines intelligence failures in light of the disciplines. Failures become examples of insufficiency or dispensability in facilitating a supported function. In this view, major failures might extend across multiple disciplines. For example, US analysis in 1950 of China's entry into the Korean War misread Beijing's warnings and changes in force posture (descriptive), the evolution of Beijing's threat perception and ties with Moscow (evaluative), and the most likely and most dangerous courses of action for military intervention (estimative); the analysis was insufficient for command action, regional policy, and military planning all at once.[33] More modest failures—times when work within a single discipline proved unnecessary, for instance—might be more common, but are less common in the literature.

Integrating technology

Finally, the typology suggests a direction for the profession's integration of new technology: back to basics. Low-uncertainty epistemic and descriptive work is both readily suited for new tools and increasingly in need of them. Conversely, high-uncertainty work, such as attempts at big-data event prediction, remains out of reach.

In the end, typology is a tool. It does its work through abstraction and succeeds if a given example sharpens concepts, clarifies relationships, and enables meaningful advances in related work.

The heart of this distinction is the type of uncertainty involved. New big data, artificial intelligence, and machine learning tools are able to expand what officers know, reducing epistemic uncertainty. However, they are unable to smooth the variability inherent in the world, making them just as vulnerable as traditional methods to aleatory uncertainty.

Even this limited scope is important, though, because the contours of epistemic uncertainty are changing. Data is growing more plentiful but also less trustworthy, making it more difficult to answer basic questions about reality. Increasingly, a profession that once established truth is being asked to adjudicate "truthiness." Clients encountering misleading reports on social media, rushed articles from questionable outlets, or suspected deception or disinformation will want to know: "Is this real?" A back-to-basic integration of technology answers this evolving mission need by reinforcing epistemic analysis.

New tools also promise to bolster descriptive analysis by speeding updates, enabling a fuller story to reach clients more quickly. They could even provide for some prospective work, such as event warning through the near-automated

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monitoring of indicator lists informed by more data than previously possible.

Conversely, however, the typology suggests a skeptical view of predictive analytics applied to high-uncertainty questions. This includes some common ideas, such as unbounded real-time forecasts, prediction markets, analyst prediction rankings, and aggregated scores for unrealized potentialities like situational risk or opportunity. Here, investment seems to promise more frustration than progress, however attractive the image of such capabilities might be.

Back to the Future

In the end, typology is a tool. It does its work through abstraction and succeeds if a given example sharpens concepts, clarifies relationships, and enables meaningful advances in related work. Here, the effort seeks to go "back to the future," revisiting old concepts to help the profession adapt to a rapidly changing world.

What does the new typology discover? It finds in analytic disciplines a path to the future of the profession, with opportunities to rethink theory, warning, discourse, doctrine, education, evaluation, and technology for the years to come.

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a. The exception to both departures is epistemic analysis, which accepts a standard of accuracy and exists independently from clients' duties. Here, an evaluator would look for correspondence between a claimed fact and reality. At that time, was the adversary's First Corps organized the way the product claimed? Is that really what a foreign leader studied in school?

The author: J. Eli Margolis is a senior intelligence analyst at the Defense Intelligence Agency. He presently focuses on the military capabilities of a foreign power.

Endnotes

1. The criteria for professions in general have occupied a great deal of social science and intelligence literature. For example, Randy Hodson and Teresa Sullivan suggested that the criteria of professions in general include abstract, specialized knowledge; autonomy; authority over clients and subordinate occupations; and altruism. (Randy Hodson and Teresa Sullivan, *The Social Organization of Work* [Wadsworth, 2012]) Older studies, though not without objection, also discuss criteria of discretionary skill, functional exclusivity, and a system of credentials. (Eliot Freidson, *Professionalism: The Third Logic* [University of Chicago Press, 2001]. For an opposing point of view see Robert Dingwall, "Accomplishing Profession" *Essays on Professions* [Ashgate, 2008].) The criteria of professions usually applied to the Intelligence Community include a governing body, performance standards, a system of education, a system of certification, a system of knowledge management, reliable methodology, and institutionalized organizational learning. (James Bruce and Roger George, "Professionalizing Intelligence Analysis," *Journal of Strategic Security* 8.3 [2015]. Rebecca Fisher, Rob Johnston, and Peter Clement, "Is Intelligence Analysis a Discipline?" in Roger George and James Bruce, *Analyzing Intelligence: National Security Practitioners' Perspectives* [Georgetown University Press, 2014]. See also a special issue of *Intelligence and National Security* addressing this subject: 32:5 [2017].)
2. Joseph Gartin, "The Future of Analysis," *Studies in Intelligence* 63 no. 2 (June, 2019).
3. Other typologies have been less consequential. For example, Jennifer Sims, Jack Davis, and John Gentry each identify four types ordered by practice. Sims describes basic work (cataloging knowledge), analysis (recognizing patterns), assessments (interpreting cases), and estimates (judging probability). In a similar way, Davis identifies facts (verifying information), findings (recognizing patterns), forecasts (making judgments and predictions), and fortunetelling (making poor, unsupported assessments). Separately, Gentry outlines monitoring, warning of threats, warning of opportunities, and estimates as distinct analytic practices. (Jennifer Sims, "Decision Advantage and the Nature of Intelligence Analysis" in Loch Johnson, ed., *Oxford Handbook of National Security Intelligence* (Oxford University Press, 2010); Jack Davis, "Defining the Analytic Mission: Facts, Findings, Forecasts, and Fortunetelling," *Studies in Intelligence* 39 no. 3 (1995); John Gentry, "Assessing Intelligence Performance," in Johnson, ed, *Oxford Handbook of National Security Intelligence.*
4. Sherman Kent, *Strategic Intelligence for American World Policy* (Princeton University Press, 1949).
5. John Hedley, "The Evolution of Intelligence Analysis in the US Intelligence Community," in George and Bruce, *Analyzing Intelligence.* Woodrow Kuhns, "The Beginning of Intelligence Analysis in CIA," *Studies in Intelligence* 51 no. 2 (2007).
6. Director of National Intelligence, *National Intelligence Strategy, 2014* at https://www.dni.gov/files/documents/2014_NIS_Publication.pdf; Director of National Intelligence, *National Intelligence Strategy, 2019* at https://www.dni.gov/files/ODNI/documents/National_Intelligence_Strategy_2019.pdf?utm_source=Press%20Release&utm_medium=Email&utm_campaign=NIS_2019.
7. David Collier, et al., "Typologies: Forming Concepts and Creating Categorical Variables," in Janet Box-Steffensmeier, et al., eds, *Oxford Handbook of Political Methodology* (Oxford University Press, 2008); David Collier, et al., "Putting Typologies to Work: Concept Formation, Measurement, and Analytic Rigor," *Political Research Quarterly* 65.1 (2012); Kenneth Bailey, *Typologies and Taxonomies: An Introduction to Classification Techniques* (Sage, 1994).
8. This formulation joins a leading theory of intelligence generally (adaptive realism) with a convincing craft explanation of analysis specifically. (These ideas are broadly compatible, as Warner suggests.) It is deliberately narrow in focusing only on the analytic component of the theory. On adaptive realism, see Jennifer Sims, "A Theory of Intelligence and International Politics," in Gregory Treverton and Wilhelm Agrell, eds, *National Intelligence Systems: Current Research and Future Prospects* (Cambridge University Press, 2009); Jennifer Sims, "Defending Adaptive Realism: Intelligence Theory Comes of Age," in Peter Gill, Stephen Marrin, and Mark Phythian, eds, *Intelligence Theory: Key Questions and Debates* (Routledge, 2009); and Sims, "Decision Advantage." On reducing uncertainty, see Kristan Wheaton and Michael Beerbower, "Towards a New Definition of Intelligence," *Stanford Law & Policy Review* 17:2 (2006); and Thomas Fingar, *Reducing Uncertainty* (Stanford University Press, 2011). On the compatibility of these ideas, see Michael Warner, "Intelligence as Risk Shifting," in Peter Gill et al., *Intelligence Theory.*
9. There are many different ways of conceptualizing uncertainty. Daniel P. Thunnissen, "Uncertainty Classification for the Design and Development of Complex Systems," California Institute of Technology, 2003, at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.128.133&rep=rep1&type=pdf; Aleksandra Bielska and Chris Pallaris, "Understanding Uncertainty in Intelligence Analysis," i-intelligence.eu; Brian Rathbun, "Uncertain about Uncertainty: Understanding the Multiple Meanings of a Crucial Concept in International Relations Theory," *International Studies Quarterly* 51 (2007). However, the distinction between epistemic and aleatory uncertainty is both common and promising for understanding analysis; see David Tannenbaum, et al., "Judgment Extremity and Accuracy Under Epistemic vs. Aleatory Uncertainty," *Management Science* 63:2 (2017); Michael Mazarr, *Rethinking Risk in National Security* (Palgrave Macmillon, 2016)
10. Josh Kerbel, "Coming to Terms with Anticipatory Intelligence," War on the Rocks, 13 August 2019 at https://warontherocks.com/2019/08/coming-to-terms-with-anticipatory-intelligence/.

11. William Burr and Jeffrey Richelson, "Whether to 'Strangle the Baby in the Cradle': The United States and the Chinese Nuclear Program, 1960–64," *International Security* 25.3 (2000-01).

12. June Teufel Dreyer, "Deng Xiaoping And Modernization Of the Chinese Military," *Armed Forces & Society* 14.2 (1988); Nan Li, "Organizational Changes of the PLA, 1985–1997," *China Quarterly* 158 (1999). Taylor Fravel, *Active Defense: China's Military Strategy Since 1949* (Princeton University Press, 2019).

13. Michael Dillon, "Hong Kong" *Contemporary China: An Introduction* (Routledge, 2009).

14. The subject of strategic warning was addressed in a Studies in Intelligence-sponsored IC conference in September 2018. See classified *Studies in Intelligence* 62, no. 4 (Special Issue, December 2018).

15. John Gentry and Joseph Gordon, *Strategic Warning Intelligence* (Georgetown University Press, 2019); Cynthia Grabo, *Anticipating Surprise: Analysis for Strategic Warning* (University Press of America, 2004).

16. In different contexts, both scholars and analysts have noted the considerable obstacles to this type of warning. Richard New Lebow, "Contingency, Catalysts, and International System Change," *Political Science Quarterly* 115: 4 (2001). See also the National Intelligence Council's *Global Trends* series, available at https://www.dni.gov/index.php/global-trends-home.

17. Richard Betts, "Strategic Intelligence Estimates: Let's Make Them Useful" *Studies in Intelligence* 25 no.1 (1981); Stephen Marrin, "Why Strategic Intelligence Analysis Has Limited Influence on American Foreign Policy," *Intelligence and National Security* 32: 6 (2017).

18. Armen Der Kiureghian and Ove Ditlevsen, "Aleatory or Epistemic? Does it Matter?" Special Workshop on Risk Acceptance and Risk Communication, Stanford University, March 2007.

19. On both the challenges and inevitability of subjective probability, see Jeffrey A, Friedman, *War and Chance: Assessing Uncertainty in International Politics* (Oxford University Press, 2019), Chapter 2: "Subjective Probability in International Politics."

20. Philip Tetlock, *Expert Political Judgment* (Princeton University Press, 2005).

21. In recent years, IARPA has pursued a number of programs exploring predictive analysis, including prediction markets and forecasting tournaments. For example, ODNI, "IARPA Announces the Geopolitical Forecasting Challenge to Improve Crowdsourced Forecasts," ODNI News Release 4-18, 16 Jan 2018.

22. Paul Pillar, "Predictive Intelligence: Policy Support or Spectator Sport?" *SAIS Review of International Affairs* 28.1 (2008).

23. Sims, "A Theory of Intelligence and International Politics"; Sims, "Defending Adaptive Realism"; Sims, "Decision Advantage and the Nature of Intelligence Analysis."

24. Cynthia Grabo, *Anticipating Surprise*.

25.   J. Eli Margolis, "Estimating State Instability," *Studies in Intelligence* 56 no. 1 (2012).

26. This notion has long been contentious, with senior officials lining up on both sides of the issue. Christopher Kojm, "Intelligence Integration and Reform: 2009–2014," in Robert Hutchings and Gregory Treverton, eds, *Truth to Power: A History of the U.S. National Intelligence Council* (Oxford University Press, 2019); Gregory Treverton, "From Afghanistan to Trump: 2014–2017," in Hutchings and Treverton, *Truth to Power*.

27. Notably, others well-versed in uncertainty take the opposite view, arguing that explicitly probabilistic judgments are not only possible but a professional responsibility. See Jeffrey A. Friedman, *War and Chance.* However, a detailed discussion of the ongoing debate about the role of prediction in analytic practice is beyond the scope of this article.

28. Office of the Director of National Intelligence, "ICD 203: Analytic Standards," 2 Jan 2015, https://www.dni.gov/files/documents/ICD/ICD%20203%20Analytic%20Standards.pdf. U.S. Joint Chiefs of Staff, "JP-2.0: Joint Intelligence," 22 Oct 2013, https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp2_0.pdf.

29. Stephen Marrin, "Evaluating the Quality of Intelligence Analysis: By What (Mis) Measure?" *Intelligence and National Security* 27: 6 (2012). Daniel Byman, "Intelligence and Its Critics," *Studies in Conflict & Terrorism* 39.3 (2016).

30. Loch Johnson, "Glimpses into the Gems of American Intelligence: The President's Daily Brief and the National Intelligence Estimate," *Intelligence and National Security* 23: 3 (2008).

31. Ibid.

32. Notably, Sims also devalues accuracy, although for different reasons. Sims, "A Theory of Intelligence and International Politics."

33. P. K. Rose, "Two Strategic Intelligence Mistakes in Korea, 1950," *Studies in Intelligence* 45 no. 5 (2001).

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