# Black Swans and the Limits of Hierarchy

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## ABSTRACT

Black Swans are unknowable events, by their nature unpredictable, asymmetric and easier to recognize in retrospect: nothing is clear at the outset, there is only an emergent sense of understanding, and traditional diagnose/act/review cycles may trap us into mismatched known responses. The unknowable cannot be mitigated or fully understood through established system, process or formal hierarchy. Instead the unknowable requires *diagnosis* (emergent understanding), creation of a *coherent narrative* (our momentary understanding), *sense making* (crowd sourcing, interplay between formal and tacit/group knowledge) and *reflection* (to capture and share). Proceeding through all four steps during all events (including events that only in retrospect are regarded as black swans) requires organizational dynamism. Traditional organizations can become exhausted by tackling successive compounding changes. They take hard charging approaches, solve first-order problems, but are tired at the end. Do this constantly, and they become exhausted. They are not adapted to this new space. Dynamic organizations have adaptability in their DNA: They don't get breathless; they thrive in change. Typically they have a devolved, distributed strength, based not in systematized, formalized, codified practice, but strong sense making and distributed action.

This paper presents a case for building more efficient and agile pathways to cognitive expertise, as described our 2015 I/ITSEC paper, "The Changing Face of Military Learning" (Schatz, Fautua, Reitz, & Stodd, 2015). How do we create learning environments that encourage dynamic responses, sense making, creating different teams of different mindsets? How can this be done within the limitations of organizations, like the military, which are by their nature formal hier-archies using formal decision making processes? How do we build learning systems that create inherently curious organizations? To answer these questions, we will present a model for developing adaptable military organizations with the necessary culture and readiness to more successfully confront black swans.

## ABOUT THE AUTHORS

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## INTRODUCTION

Throughout history, organizations both large and small have pivoted and changed in response to events: a stock market crash, a war, a natural disaster. The best of these organizations, whether a society, nation, military, or corporation, not only overcome the challenge, but grow from the experience. Generally, however, these pivotal events that have occurred were (known) inherent risks in the existing system, unpredictable in their particular manifestations but predictable in relation to the current knowledge of the world. But what if an event is a so-called *Black Swan* – something so unknowable, so unexpected that it doesn't fit any of the immediate responses an organization has on hand. With Black Swan events, the full picture is not necessarily clear at the outset, there is an emergent sense of understanding, and traditional diagnose/act/review cycles may trap us into inappropriate known responses.

The unknowable cannot be mitigated or fully understood through system, process or formal hierarchy, but rather requires an organization to perform diagnosis (emergent understanding), creation of a coherent narrative (our understanding in the moment), sense making (through crowd sourcing elements and exploring the interplay between formal and tacit/group knowledge) and reflection (to capture and share). Proceeding through all four steps during all events (including events that only in retrospect are regarded as Black Swans, as happens with most) requires organizational dynamism.

Traditional organizations can become exhausted by tackling successive compounding changes (Weick & Quinn, 1999). They take hard charging approaches, solve first-order problems, but are tired at the end. When they do this constantly, they become exhausted. They do not adapt to the new space. In contrast, dynamic organizations have adaptability in their DNA: They don't get breathless; they are adapted to thrive in change. Typically they have a devolved, distributed strength, based not in systematized, formalized, codified practice, but rather in strong sense making and distributed action. How do we create learning environments that encourage dynamic responses, sense making, and different teams of who leverage their different mindsets? How can this be done within the limitations of organizations, like the military, which are by their nature organizations of formal hierarchy and formal decision making? How do we build learning systems that create inherently curious organizations? To answer these questions, we will present a model for developing adaptable military organizations with the necessary culture and readiness to successfully confront Black Swans.

This paper builds upon our 2015 article, entitled "The Changing Face of Military Learning" (Schatz, Fautua, Reitz, & Stodd, 2015). In it, we added our voices to the chorus of pundits highlighting that the world is changing at an increasingly rapid pace. We explained that globalization, ever-increasing computing power, proliferation of low-cost advanced technologies, the democratization of communication, rise of social collaborative technology, and an increasingly fluid notion of "nation" and "identity" have created remarkable levels of worldwide volatility, uncertainty, complexity, and ambiguity. To remain competitive, organizations (to include military coalitions) must identify ways to develop and enable both systems and personnel to continuously learn, adapt, and grow. Towards that end, we presented five recommended lines of effort, including "encourage and empower social learning," which is discussed in detail, in the present article using the added context of Black Swan events.

## BLACK SWANS

Black Swan events, as described and first called such by Taleb (2007), essentially describe the idea of the unthinkable. People historically believed black swans (the actual birds) could not exist in nature, until they were "discovered" – shattering assumptions that were considered absolute and creating a paradigm shift. The term is used today to mean

the unthinkable, the things we are neither trained for nor which fall within our sphere of understanding: the unknown unknowns.

In parallel to the Black Swan concept, we introduce the notion of the "limits of hierarchy". This is the idea that formal, hierarchical organizations are often poorly suited to respond to these unknown unknowns. While formal hierarchy regularly codifies curiosity, diagnosis and response, it does so within known frameworks of understanding, either of the organization's own creation or imposed from outside (Morgeson, Mitchell, & Liu, 2015). Black Swans challenge those frameworks. Thus, by their systematized nature, formal hierarchies not only often fail to identify and respond to Black Swans, but they are fundamentally unable to do so, because formal hierarchy draws upon different types of power, different frames of understanding that have evolved and streamlined in response to coping with the status quo and preparing for knowable risks.

## FRAMES AND SCRIPTS

The concepts of frames and scripts have their roots in both early artificial intelligence development and in psychology. Minsky (1975) posited that a frame is a structure for representing a stereotyped situation, and Shank (1975) proposed that general episodic memories were contained in scripts, which allow individuals to infer meaning in a situation where information is incomplete and take action according to a set of acceptable behaviors. More colloquially, and for our purposes, frames create the stage, and scripts describe the expected behavior patterns; scripts provide cognitive efficiency by defining cognitive pathways for both the "viewers" and "actors" (Tannen, 1993).

### Known Frames and Known Scripts

We operate largely in Known Frames. These are the spaces where cause-and-effect function as society expects. We are generally comfortable with the rules within Known Frames. An example of a Known Frame would be a football league: We are comfortable with the rules and concepts within which the league structure operates. While we may rely on statistics, opinion and observation to determine who wins, we are operating within a frame that says someone will win, someone will lose, or that there will be a draw, all of which are plausible and anticipated outcomes within the Known Frame. Within this Known Frame, a small team with virtually no chance, with the odds heavily stacked against them, may come through to win. It is unexpected, but not impossible to conceive. It is unlikely, but not incomprehensible as the potential is inherent within the boundaries of the Known Frame.

Within Known Frames, we move between Known Scripts: Each cued up and executed according to triggers. Sometimes scripts are triggered internally, by what we are trained or conditioned to. Other times, scripts are based on a group or team dynamic. When you walk into a bar, for instance, your actions are governed by Known Scripts, such as the social dynamics that help you choose which seat to take (e.g., a stool by the bar but not a spare seat at a table where a couple is already sitting). When we operate in a team dynamic, our actions are similarly governed by scripts. For example, when someone hands us a drink, we say "thank you". There is no cognitive overhead to saying "thank you"; we are conditioned into it. It is learned behavior.

While we can be shaken out of scripted responses, they tend to be elastic and will snap back. This is hugely significant. Because of this, we can be drawn into specific, scripted behavioral and cognitive pathways that significantly restrict our perspective and ability to read and respond to situations, and we may not realize that the walls are closing in and our responses have become calcified to change. This is a classic failure of formal systems, that is, as a scenario gains an internal momentum the organization becoming increasingly blind to an evolved understanding of the reality outside its narrow perspective. People begin to see only those cues that confirm their expectations, and new or unexpected details are assumed to be outliers – if we notice them at all.

### Unknown Frames and Unknown Scripts

Unknown Frames are beyond our experience or understanding. We do not have the associated conditioned responses, or, alternatively, we draw upon mismatched Known Scripts so that the situational cues trigger inappropriate responses. In other words, our experiences with Known Scripts may condition us into precisely the wrong responses (i.e., responses correct in the Known Frame, but entirely at fault when we find ourselves in an Unknown Frame).

A premise of Black Swan events may be that they operate outside of Known Frames; they are not simply unlikely or unforeseen, but rather they are un-anticipatable within a known context. Worse, we may be blinded by the Known Frame or convinced we have an understanding within a known context, when in fact we are simply observing the unknown and misclassifying it.

A parallel is risk is that a system mistakenly believes it has identified a Black Swan event. Using its existing Known Frames of understanding, codified and reported according to its Known Scripts, an organization may believe it has uncovered a "Black Swan", when, in truth, it merely encountered a complex and unlikely occurrence – improbable but conceivable. The system was observing outliers, not Unknown Unknowns; however, the hierarchical organization *believes* it has correctly identified and managed a Black Swan risk and, therefore, that it is robust (able to respond) – when, in fact, it was just highly stressed and may actually be quite brittle.

## CYNEFIN AND OODA

The word Cynefin (*ku-neh-vin*) is Welsh and roughly means habitat—as in all of the things that surround us and influence our thinking and actions

There are many models for business and the military for making sense of a situation, developing a plan, or making a decision. Some define a formal analysis process (e.g., Prince Analysis [Coplin & O'Leary (1972)], Monte Carlo Method, and Return on Investment). Other models provide explanations of everyday processes, such as Cynefin or Recognition Primed Decision Making (Klein, 1998), and it is those models we have an interest in. The Cynefin model (Snowden, 2002; see Figure 1) includes four situational categories, which describe the degree of complexity and ambiguity within a given situation. Among other things, each category affects the status of knowledge enacted within it; a simplified description follows:

- **Obvious:** This category contains known knowns and routine activities, relying on standardized process
- **Complicated:** This category includes known unknowns, which are discoverable through analysis
- **Complex:** Under complexity, unknown unknowns permeate, but can be managed through probing and teams
- **Chaotic:** Under chaos, knowledge is turbulent and unconnected – where action comes before sensing is completed. Cause-and-effect relationships are often unknowable or no longer make sense, even in retrospect.

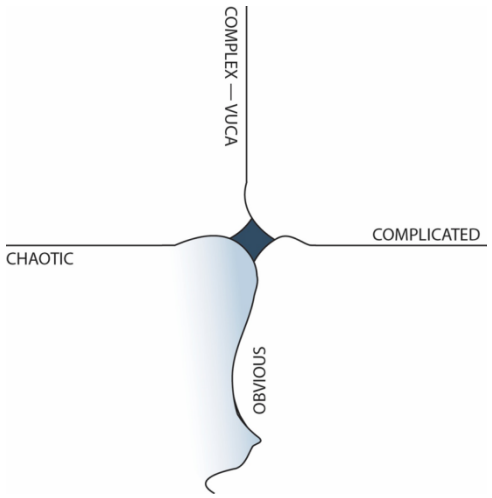


**Figure 1.** Cynefin Model (the Cognitive Edge, 2010). The Cynefin Model organizes situational states in relation to their knowledge management components.

Each of these four categories is edged by Disorder, the central area. When a situation is disordered, it is not clear which situational category applies.

One importance of this model is in elucidating an awareness of the borders between distinct knowledge situations and, correspondingly, the different methods of effective sensing, deciding and acting in each quadrant. As a group transitions over one of these borders, a new model for decision-making should be triggered (Snowden, 2002). For example, the obvious and orderly environments involve tried-and-true processes that require knowledge and execution of predefine best practices; in contrast, complicated environments rely upon expert diagnosis, time-consuming fact-based analysis, and good (but not *best*) practices.

For our discussion, the border between the Chaotic and Obvious quadrants is of particular interest. This jagged line representing a one-way cliff. Obvious environments – which by the model's definition rely on formal hierarchies and defined process – can rapidly fall into chaos when the complacency of the status quo blinds the organization to fundamentally changing factors. When this sudden failure of known process occurs, the organization is thrown in chaos.

Although they may be less dramatic, other mismatches between the (actual) situational frames and current organizational actions can cause failures or, at least, inefficiencies. Sense-makers must be open to regularly reassessing their interpretation of a situation (Weick, 2002), because the transition between stages often occurs unnoticed; thus they often continue to operate within a frame when it is no longer appropriate.

Within the military community, Cynefin is sometimes paired with the OODA (Observe – Orient – Decide – Act) model (Boyd, 1996). Effective individuals and organizations move through the OODA process swiftly and continuously, constantly taking in new cues, analyzing them, making or revising decisions in response, and taking action accordingly. The OODA *orient* phase not only involves situational analysis; it takes into account the person performing the analysis, and the background and traditions of that person. Using the OODA loop within the context of Cynefin is even championed by the Cynefin creator (Snowden, 2012).

## THE FALSE COMFORT OF CATEGORY ERRORS

Even effective traditional diagnose/act/review cycles of problem solving, such as the OODA loop, are vulnerable to errors. Their very efficiency makes them especially susceptible to category errors in Black Swan–type events. A category error is a semantic failure, whereby something is prematurely and inaccurately "made safe" (Ryle, 2009). For Black Swans we have two potential errors: one, they are misclassified into Known Frames, triggering Known Scripts that may be entirely inappropriate; or, secondly, we may be at a loss for how to categorize them at all, leaving us immobilized, unsure how to react.

### Misclassified Frames

First, consider the misclassification category error. In it, an unknown category is mistakenly classified as a particular Known Frame. These types of errors can blind organizations to what is really occurring in the event. Then, once the event is (mistakenly) framed, a domino effect begins: Organizations trigger kinetic systems to react in defined ways – according to formal scripts, under formal authority, and within Known Frames. Which may be precisely the wrong thing to do.

As an example, the sight of a man running, clutching a bag, while a woman screams triggers a categorization of "robbery in progress". The categorization is triggered by a Known Script (known maybe through drama and news reports, if not through lived experience, i.e., social conditioning), within a Known Frame (men mug women more often than women mug men). Replay the same situation with a women running, screaming, from a man, where she is holding the bag as she runs. In that case, typically, we are triggered into a reading of the situation where the man has assaulted her, and she is escaping. In both cases, the bag is leaving the scene of the original encounter, but the context provided by our scripts leads directly to our reading of the situation.

Both situations can easily trigger a kinetic response from a highly effective formal system (police chase the man) or social system (bystanders chase the man). And this is a relatively simple system to categorize; what if the scripts are complex or chaotic? Overlapped and long duration? Then add in the distorting effects of perspective and cropping; for instance, if you can see the man running to get into a police car, you may re-categorize him as "undercover", but if you can't see the car, you have an incomplete picture. Context for the viewer provides for different scripts (St. Clair, Thome-Williams, & Su, 2005).

In social terms, for instance, this takes the form of judgment based on known visual, contextual or behavioral scripts and value-based judgments, e.g. is the person older, in a uniform, smart or casual, wearing any identifiable markers and so on (Bargh, 1994). Consider within a war zone where a man walking with a heavy pack may be construed and classified in a number of ways: picking up a sack of rice from an aid drop, carrying munitions, looting from abandoned homes. What if the man is wearing a uniform: if the insignia are familiar, we may be triggered into considering them friendly. If the uniform is ill fitting, we may consider it more likely that it's borrowed or fake.

There are other types of classification that can be tricky: consider someone on their mobile phone on the periphery of a small civil disturbance: are they calling for support, calling for help, calling to see if their brother is involved, or a citizen journalist calling the story in? The type of classification utilized can trigger specific scripts and action: worse, the application or misclassification of a frame can blind us to alternative frames.

Once the Known Frame is identified and the Known Script initiated, there is often little incentive to question it. (In fact, several cognitive and social biases – including confirmation bias and groupthink – actively work against questioning it [Elangovan, 2002].) Once the problem space is defined and the actors set in motion, it is a stretch, within a formal system, to question the validity of the stage itself. Thus, Known Frames and Known Scripts are self-reinforcing: If there are ten people on a cell phone at the edge of a disaster, we become efficient at categorizing people on cell phones near a civil disturbance as potential concerned citizens. And it "feels" odd to question the validity of the assumption. Reinforcement of a cognitive concept leads to it becoming less permeable to change. It becomes more dense, the more it is reinforced (Kelly, 1977), and as a result, inflexible, misaligned processes, decisions, and activities gradually accrete through the system.

**Disorder: Unclassified Frames**

A related error may occur when the cues offered by context cannot be interpreted; in this case, the organization losses its ability to make sense of the situation, leaving it unable to categorize the event into a Known Frame, and as a result, making it unable to execute any Known Scripts.

Generally, organizations work hard to ensure this does not happen. Organizations are adapted to make decisions and take action, according to set process and norms: we can consider them to be formal systems. Formal systems dislike ambiguity. Known Frames have well understood relationships: even if uncomfortable, they are clear. Unknown Frames, and ambiguity in general, tend to stress systems (Ghosh & Ray, 1997). For systems (both organizational and social ones), unknowns create risk, and the mitigating action is to categorize. Hence, even when a misclassification category error could be avoided, the ambiguity tolerance of formal hierarchical systems tends to force its occurrence. That is, even when we have a sense that a given Known Frame may be misaligned, the formalized organizational structure encourages us to "force" a Known interpretation onto the Unknown situation.

**How to Resolve Classification Errors?**

Crucial to the question of Black Swans and the limits of hierarchy is this: Once a frame is in place, all the scripts, their triggers, and corresponding activities happen. It is very hard to question a frame once we are within it, and this is the problem with category errors. In typical conditioned and trained responses, we encourage and support diagnosis (determine the frame), action (within the frame, utilize scripts to determine and take appropriate action) and review (consider how effective was the action) (Murata & Nakamura, 2014).

For organizations to avoid categorization mistakes, they need to keep the problem space undefined for as long as possible, yet still retain the ability to react decisively. To achieve this, an organization must, first, understand how decisions are made within it. That is, organizations need to understand the interplay of formal hierarchy and tacit knowledge; that is, we can see the output from a decision-making system, but do we fully understand how the decision came to be made? Secondly, the organization must understand the mechanisms by which it can act while simultaneously reframing. How can an organization actively keep the problem space open for longer, to provide wider perspective and greater time to access and utilize their sense making capability? How do organizations do that in a way that lets them respond to complex and potentially unknowable situations? And, how do we train for this?

Black Swans are not unknown and unpredictable by any cosmic set of standards; they are just unknown and unpredictable within our learnt, culturally defined and experiential frames. To mitigate our own biases, we need a kind of organizational agility that opens up spaces for analysis and conversation outside of the formal hierarchy and hardened Known Frames, one which allows the organizational and social freedom to explore actions outside of Known Scripts.

## THE LIMITS OF HIERARCHY: BRITTLE SYSTEMS

Overly hierarchical systems may be very good at problem solving and taking action, but at the cost of not actually understanding what makes them effective or the basis upon which decisions are made and actions taken. Such highly hierarchical and action-oriented systems may be great within a set of Known Frames, and accidentally effective in some Unknown Frames, but ultimately they may be vulnerable to emergent, asymmetric and unpredictable events. To some extent, they are self-delusional about their fitness for an adapted threat.

**Trapped by Scripts; Restrained by Hierarchy**

One weakness of overly hierarchical systems is their brittleness. Consider this: Known Scripts have a deterministic power to trigger other Known Scripts. While cognitively efficient, this leaves them open to subversion or delusion by category error. The subversive power of Unknown Scripts may be maliciously utilized, for example, in simple phishing scams by email that use Known Scripts (this email is from my online banking system) to trigger other Known Scripts (I should provide my bank account number) but without the underlying validity. Effectively, once an Unknown Script is past the gatekeeper, it operates unhindered.

Not only is it unlikely that misclassified frames (and correspondingly misaligned scripts) will be spotted, but even when they are, taking action relies upon challenging the formal hierarchy itself – which is a high-consequence activity. Even if the validity of a Known Frame or Known Script is questioned, we tend to self-censor to avoid taking action; this creates significant risk in formal hierarchies, because left unhindered Known Scripts continue to trigger other Known Scripts taking us deeper into the rabbit hole. This can be seen in retrospect when we see strong systems collapse. This is why when a system fails, it tends to fracture, not fail slowly. There is no gradual questioning of the validity of its scripts, but rather a point where the illusion of the whole thing becomes unsustainable. At that point, where we suddenly recognize we are not within a Known Frame.

There can be no single approach to diverting scripts or diffusing their power, as their source of power is widely distributed, highly contextual, and even adaptive. It is hard to de-power the script in isolation, especially bearing in mind the wide range of energies they can utilize, so instead we need a way to capture the isolated clues and draw them together into a wider narrative, and we need to make this a low-consequence activity, where individuals do not fear formal or social censure for voicing their concerns.

**Fostering Resilience through Social Dynamics**

Formal systems want to (and are good at) identifying threats, categorizing them, and then taking decisive action against them. To avoid being blinded by Known Frames and Scripts, an organization needs to hold open a space for ambiguity, at the very time when ambiguity is the enemy of decisive action. Thus, to build resilience into the system, we need to build space for the ambiguity, along with permission, narrative frameworks and controls to allow the subsequent reframing to occur.

A robust system, therefore, must be *socially dynamic*. This means it is finely tuned with a deep self-awareness of how decisions and outcomes came to be, not only the resulting operational outcomes or single-point decisions. The strength comes from the system's ability to self-analyze, self-correct, self-style, and self-moderate (Maitlis, 2005). This kind of system, while it may be enveloped by strong hierarchy, needs to contain spaces where *social authority* prevails. This means a system where merit, demonstrated expertise and different contributions are the currency of power – and are not overshadowed by mechanisms of formalized power (such as seniority or age). When this occurs, many different perspectives can be considered, with those gaining most collective traction growing in prominence.

The challenge of socially dynamic systems, which rely upon informal power structures, is that they have no single source of power; the entire social system itself is the power. There is no clear hierarchy, as the power is not captured within a single definable system but rather a multi-layered, multivariate, fluid and ever-changing network (e.g., see Brafman & Beckstrom, 2006). Systems relying upon social authority require tacit knowledge, which has been described as ineffable (D'Eredita & Barreto, 2006), wisdom that is hard to encode into a transferable medium because of its personal experiential nature, but which has strong proliferation among a community of activity or practice. Despite these difficulties, once established such distributed socially dynamic systems are inherently robust; biases, flaws, and external pressures may create deformations locally, but they have little impact on the whole system.

Structures built wholly on social authority are, of course, less suited to some situations. However, if we can build a socially dynamic structure in parallel with a strong hierarchy, we have a system that is both decisive and yet robust. (A rigid, formal hierarchy, by contrast, is decisive and yet brittle.) We propose that the mechanism to do this is a narrative framework that allows a continuous conversation around the validity of the current frame and a safe prototyping space to explore alternative contextual interpretations.

## CONFRONTING BLACK SWANS: THE DYNAMIC RESPONSE FRAMEWORK

Using the concepts of frames, scripts and social authority leads into the theoretical resolution to the problem: a framework to learn the scripts and evolve the power structures within organizations. Achieving this requires a Dynamic Response Framework: *response* because it is about taking action (something that action-oriented systems enjoy and are good at), and *dynamic* because it is more capable of adapting as the scripts unfold. The specific dynamic responses proposed include diagnosis (emergent understanding), creation of a coherent narrative (our understanding in the moment), sense making (crowd sourcing elements and exploring the interplay between formal and tacit/group knowledge) and reflection (to capture and share).

Consider black swans in a cyber context: in the ideological battles taking place in cyberspace, power is highly social and reputational. Small centers of extreme ideology can be empowered by large social communities, providing validation and authority. But a view of 'hostile' or 'friendly' may be hard to apply in this context: possibly a better term is 'influenced'. Deploying hard power, formal power, against a socially moderated authority may simply empower it. Instead, we may need to deploy alternative loci of attraction.

In this context, an initial frame may be to classify someone engaged in an online forum as 'hostile', and to deploy scripts of power against them (investigation, sanction, denial of access, denial of liberty), but these hard forms of power may actually empower their belief and their support. We may codify their soft belief into a hard one. Instead, we can seek to create ability: alternative spaces where their voices are heard, and responded to, engaged in dialogue, not simply denied. We are not seeking to create spaces that we enjoy, rather to deny social power to those people truly deeply entrenched in their hostile views. We talk about 'radicalization' as though it has an internal power, but in fact it's simply one route down a road that can be retraced or reversed (Horgan 2010). The way we classify the frame, the scripts deployed, and the type of power applied can impact outcomes. If we simply rationalize what we see into known frames, we create a true Black Swan, where we feel safer whilst being truly destabilized.

### Diagnosis

Diagnosis represents the active process of evaluating Known Frames and Known Scripts, moving from a subconscious response to scripts through to a conscious awareness of the need to question them. This process requires broadminded observation of contextual indicators, space for multiple (possibly competing) interpretations of indicators, and corresponding permission to challenge formal structures.

At the heart of resolving the challenge of Black Swans is an ability to pick up on weak signals. This is by no means a new concept (Ansoff, 1975), but we have a new context where there is more information available than ever before and, crucially, new ways of filtering through social systems, which provide an innate "sense making" capability that may be more accessible to different types of (nonhierarchical) power. Consider the OODA loop and its first stage, observation. In our framework, dynamic observation requires a recognition of the limiting power of formal perspectives and the development of a distributed observational capability, such as is typical within a socially motivated sense making system. When we are observing, this is about ensuring we have sight of and a narrative around, the weak signals.

When it comes to the second step of the OODA loop, orientation, we then have two parallel narratives to consider: the narrative of the strong signals and overwhelming perspective (bolstered by Known Frames and formal organizational hierarchies), and the narrative of weak signals and argumentative voices. The ability to navigate these two in a conscious way may be key to avoiding initial category errors. Within a formal hierarchy unexpected signals can be seen as either highly relevant and strongly supporting existing momentum or as challenges to the Known Frame and thus dismissed or otherwise "made safe". We have to retain the space to argue within the system while not compromising the effectiveness of the system.

The role of narrative at this stage is not to capture one coherent narrative, but rather to capture concurrent and emergent stories, observations and interpretations from within the system. This is where we create the space for ambiguity, and, crucially, the space cannot be formal, but rather must permit and encourage social narratives from outside the formal hierarchy. The utility of this has surfaced repeatedly, and is even in current use in the military (University of Foreign Military And Cultural studies, 2012), most frequently as part of a red-teaming, contrarian way of addressing a challenge. Under these circumstances, the diagnostic space needs to be held separate from the formal hierarchy, which

needs to hold strong control of the Known Frame and Known Script and maintain its ability to trigger decisive and timely kinetic action.

We are, in effect, creating an isolated "Change Space" to hold safely the multiple narratives that would otherwise be lost, and which may contain the weak signals or tacit wisdom that can enable us to ultimately counter Black Swans. While this cannot impinge upon the effectiveness of the formal system, hierarchy, and kinetic response, it nevertheless needs to be flexible and adaptable if we are to avoid being swept along by pure momentum.

An initial categorization would be applied in the Cyber example we provided earlier: hostile intent. But in a 'Change Space' we would hold alternative narratives: what else could drive the behaviors exhibited, what other political, social or peer pressures may be at work? These alternatives do not have to seem likely: indeed, they are unlikely to seem likely, because we are blinded by the existing diagnosis and frame. The point is, we have a place to store ambiguity.

**Narrative**

Once we have this isolated Change Space, with its ability to hold ambiguity and multiple weak signals, we need to periodically create a reflective narrative that pulls sense from the weak signals and chaotic noise within it. This is not an external "expert" analysis, but rather an internally moderated analysis from within a community. It is the distributed sense making of the community that counters the brittle nature of the formal system and allows us to avoid fragility.

Succeeding, here, requires a distributed capability to introduce some layer of meta-narrative over individual interpretations. It is hard to de-power organizational frames and script in isolation, especially bearing in mind the wide range of energies they can utilize, so instead we need a way to capture the isolated clues and draw them together into a wider narrative (Isabella, 1990). The key thing is that this must be a low consequence activity (whereas challenging the scripts in formal hierarchies are high consequence actions). To do this we may be able to draw upon semantic analysis of informal chatter within the system, for example, as well as find ways to introduce dispassionate observation as oversight on the formal channel and to encourage self-organizing convergence of narratives.

The role of narrator in this space may not be held by a formal leader, but may be claimed by anyone with sufficient social authority within the system. The key thing here is that we have recognized and accepted bridging conversations whereby the sense that has been made within the Change Space has the ear of the formal system, even when the formal system itself is under stress or in crisis.

In a well-known example of how hierarchy fails in a non-Black Swan event, consider the Challenger disaster. The space shuttle disintegrated during launch because of an engineering failure, which the engineers predicted. However, the formal hierarchy and its commitment to running Known Scripts suppressed the dissenting voices. The formal voices ran unchecked, and there was simply no mechanism to capture and elevate the socially moderated dissent within the system. Similar cases of hierarchical failure are well documented in the aviation safety community after disasters, such as the Tenerife Disaster (Rouse, Cannon-Bowers, & Salas, 1992).

Remember at this point, everything within the Known Frame, the formal hierarchy, the formal power, and established system counts against us when it comes to dynamically recognizing, categorizing, and responding to Black Swan events. The ability of the system to hear the weak voices is not accidental, or necessarily convenient, according to the whim of the formal leader, but rather is codified into a structure that allows us to hold that ambiguous space and have these bridging conversations.

In our Cyber example, this would involve an ongoing analysis of the situation: what networks are we seeing organizing, where are the nodes, who are the amplifiers, which stories are spreading, and how. What are we seeing that is reinforcing our frame, what is possibly challenging it? At this stage, we are not looking to prove or disprove the frame: we are seeking to hold ambiguity and difference. If we moderate it at this stage, we are simply reinforcing our formal viewpoint and existing frame: this is precisely what empowers the potential of a Black Swan.

**Sense Making**

The diagnostic space allows ambiguity to be maintained, the narrative and storytelling framework enable interpreta-

tion, and now all that remains is to bring together the formal and informal system elements through bridging conversations. This takes the process into a semiformal space, where the social system and formal hierarchical system find a dialogue. At the endpoint we may not just have formal and social systems, but rather a middle space, a new role which is recognized or tolerated by the formal hierarchy and recognized and respected by the social system.

This middle space may involve new roles, such as social storytelling roles, which gains authority from the informal social tribe but which are also recognized by the formal system and hierarchy. These pragmatic storytellers leverage distributed strength to help counter Black Swans.

Social filtering and sense making would help to explore the validity of existing frames, and test new hypotheses in the Cyber example. We need to listen to voices within the formal system, but also to recruit alternative voices, possibly even voices outside secure networks and spaces. Our own viewpoint blinds us to alternative views: we can either seek to change our bias (which the literature says is difficult [Lilienfeld, Ammirati, & Landfield, 2009]) or utilize alternative storytellers, with different bias. This 'sense making' should provide a foundation for alternative responses, specifically responses that can de-power scripts and diffuse unknown power.

**Reflection**

There is a process within Social Learning called "looping" (Chirichello & Chirichello, 2001), where we take the tacit group wisdom of the community and feed it back into the formal system, so that learning becomes part of the formal system. Without this looping process, the knowledge gained through social systems is forever held in a fragile and distributed network of tribal knowledge, meaning it is unavailable to all. Such is the tension between formal and social systems. Formal systems are robust but maladapted; social systems are fluid but often invisible and unquantifiable.

We need to codify reflection beyond what is typical in an organization today, to include conscious narrative and reconciliation of the different viewpoints that were held in the moment, the fragile voices of doubt and enlightenment. This final reflective process, which recognizes the validity of both formal and social importance, reconciles the ambiguity of the Change Space that we created at diagnosis, as well as the formally powered action of the hierarchal system.

In a genuine Black Swan situation, this process will continue to loop, as the consequences and fall-out from the event propagate, until a homeostasis of understanding is achieved. Ideally, the application of the previous stages to an event such as the cyber activity noted above would keep a Black Swan from occurring, leaving reflection to provide refinement for future reference during the Diagnosis stage.

**Dynamic Response Framework: Example and Summary**

A small military team arriving in a new location needs to carry out rapid sense making to ground themselves in local reality (whether this is for a disaster recovery, or for stabilization operations matters little in practice). Partly this is done through physical sensing (what we see and hear), through learned context (what we expect based on training or what we have seen before) and through anticipated reaction (if I do this, I expect that outcome). Typically when we acclimatize we explore physical spaces, establish local relationship and "ground" ourselves.

Part of this 'grounding' is to superimpose a Known Frame onto the situation (which is where we can set the foundations for the future failure of assumption). In the context above, there may be multiple and highly contextual webs of power and control operating within this new location, all invisible to physical senses and hidden to our collective sense making power. Once the Frame is set, the team will continue to behave within it: cautious, aware, but still employing Known Scripts within a Known Frame.

Utilizing the Dynamic Response Framework, they would still make an initial diagnosis, but would hold open a space for ambiguity. This would consist of formal reports on activity (the leader narrative of decisions made) but also the devolved social narrative (a product of the co-created social interpretation). Through structured and periodic sense making, there would be a process of reconciliation of the two: the purpose being to hear every voice in order to surface weak signals. As situations evolve, the organization runs parallel conversations, one decisive and formal around the next decision and the other more ambiguous and social around the foundations behind assumptions. To be clear, these alternative narratives would in no way compromise the ability of the agencies to make rapid and effective decisions, but rather would surface more explicitly the Frames and Scripts at play. And because these narratives are socially

moderated, they cannot be silenced if inconvenient. Effective social stories would have allowed engineer voices of dissent to be heard and, when relevant, amplified, to the benefit of the whole system.

## CONCLUSION

In this paper we have sought to understand the limits of hierarchy when responding to Black Swan–type events. The inability of the system to respond effectively is not due to the nature of the threat itself, but rather the narrow range of cues, interpretations (Known Frames), and actions (Known Scripts) upon which formal hierarchies can draw. Essentially, the strength of formal systems is in their ability to respond via Known Scripts within Known Frames, even to outlying events within this context, but this strength can be entirely undermined by Unknown Frames and (the sometimes intentionally subversive use) of Unknown Scripts. In this case, the things that make us strong in known contexts, make us weak in Black Swan events.

In response to this weakness, we proposed a mechanism whereby weak signals and fragile voices can be heard, interpreted, shared and acted upon by gradually transitioning them from the fully social space through to the highly formal hierarchy, in a safe and considered manner. The intention is for this to happen while in no way diminishing the ability of the formal system to respond at speed and with strength. It does however balance the ability of the system to respond, making it less susceptible to Unknown Frames, less susceptible to category errors, and better able to drain the distributed power of Unknown Scripts.

In many aspects of the Social Age we see the disruptive effects of new technologies, the impact of democratized collaboration and communication, fluidity of identity and power, and the rise of social authority. At its best this gives us access to tacit group knowledge, fragile voices, distributed strength and democratized capability that were previously unavailable to formal systems. At its worst it leaves formal systems entirely incapable of and unable to respond to perplexing, dynamic, fluid and adaptive threats, where our own energy and strength work against us.

The Dynamic Response Framework is an early attempt to bridge that gap by respecting the strength of the formal system while holding spaces where social sense making can occur, despite the lack of formal authority and power. If implemented successfully, the proposed framework will help foster socially dynamic organizations, which can retain the best of their old strengths but are able to move away from pure mechanisms of control to mechanisms that are facilitating and enabling, working synchronously with community not simply seeking to control it.

This lies at the heart of the military challenge: to retain the best of the existing system's ability to control, respond, and act with kinetic force, while adapting to a new space of collaborative technology, devolved knowledge, adaptive learning, social authority, distributed power, asymmetric threats, and enemies that are multi-dimensional and complex, not only in their challenge, but in their very sources of power. These threats create new unknowns, which cannot be mitigated or fully understood through system, process or formal hierarchy alone, but rather requires diagnosis, narrative creation, sense making, and reflection. We must counter them – not by "doubling down" on investments in Known Scripts – but through our own social power, beyond the spaces where hierarchy alone can guide us.

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