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Linear and Non-Linear Thinking: Beyond Reverse-Engineering

by Ben Zweibelson

“When does this happen in the movie?”

“Now. You’re looking at now. Everything that happens now is happening now.”

“And then?”

“We passed then.”

“When?”

“Just now. We’re at now, now.”¹

~ “Spaceballs” 1987

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Introduction

Opening with a quote from a Mel Brooks movie might be risky for the topic of military strategy. Yet in his sci-fi comedy ‘*Spaceballs*,’ Mel Brooks lampoons modern military industrial complexes for desiring technology and absolute control of chaotic and complex conditions. In many ways, Brooks is insightful (while inciting) with how our modern military institutions seek to think about complexity and time, as well as how we *think about thinking* about complexity and time. This article is not about lampooning the military as a proxy of *Spaceballs*, but an effort to foster serious discourse on how we think about military actions organized in time and space. While the follies of the ‘*Spaceballs*’ militant organization operates entirely in a science fiction setting, perhaps there are some metaphors that open unorthodox insights into the real foolhardiness of modern military planning and control. Perhaps recent engagements with the Taliban, al Qaeda, al-Shabaab, the resurgence of Russian proxy wars, and the sudden rise of ISIL demonstrate that our institutionalized ‘sensemaking’ strategies are far less prescient than we expect them to be.²

Timelines are something we often take for granted when considering how we make sense of military problems and develop plans for action. Seeing the world unfolding as a *sequence* of isolatable events makes such linear thinking habitual (our retrospection) to us. It indicates a reducible (i.e. analyzable) chain of causation. However, this simplification of reality tends to miss the complexity of interactions that have taken place in dynamic and chaotic conflict environments.³ Military planning doctrine tends to assume we can both reduce problems into isolatable chains of causation (we call lines of effort) and sequence these as planned events in linear time (from a start point to an end point).⁴ For this article, I term this the *analytic-linear worldview*.

Institutional artifacts of this belief system are plentiful - how we conduct mission analysis, construct campaign plans, decisive points, targeting cycles, and so forth. At a deeper level, this analytic and linear reasoning process dominates overarching national strategies and decisions for war as taught in our war colleges. My argument is that our exclusive *analytical* approach and *linear style* decision making opens us up to vulnerabilities and creates barriers to a more critically reflexive practice.⁵ Our institutionalized habits focus only upon analytic and linear models and are unreflexive in exploring critically *why* we think this way and what alternative ways of thinking may be available.⁶ I propose a non-linear approach to 'sensemaking' termed *holistic non-linear worldview* as one alternative paradigm to the analytic-linear world view.

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Linear Planning Equates to Linear Causality

Linear thinking itself is a metaphor, where stringing ideas occur in a line that we can consider in sequential order. Analytical reasoning works best where 'if A plus B, then C' occurs and universal laws or principles function predictably. In the physical sciences, the fields of mathematics, physics, engineering, and other 'hard science' fields rely upon analytical reasoning as the main foundation to the discipline itself. Newton's laws of motion seem to work because they routinely appear reliable, measurable, and universal for physical things.⁷ Yet, military institutions have sought analytical applications to the art and science of warfare beyond the utility of these logics in complex warfare. The 'if A, then B' approach becomes burdened outside sterile laboratories and academic exercises with the natural messiness of human complexity and war.⁸ Unlike hard science topics, the dynamic and complex nature of human societies (to include warfare) prevents us from relying exclusively upon analytical reasoning to understand reality.⁹

It is reasonable to embrace linear reasoning for *tactical* military action because of how we physically experience space and time. Biologically, we experience in a measurable, constant and linear rate. Thus, synchronizing watches for tactical operations makes sense to us, as do linear strategies that begin with an invasion, and predict total surrender after a series of campaigns and objectives.

¹⁰ As you read each word in this very sentence, time moves at a constant rate, your heart continues to beat in your chest, and your eyes blink. Life appears to move according to a linear time, where humans experience the world as Saint Augustine and other philosophers phrased "temporal beings."¹¹ We 'shuffle along this mortal coil' as Shakespeare penned, where we experience some very clear limitations in that time moves forward as our biology interprets reality. Attempting to predict the future becomes as problematic as really understanding the past.¹² We often imagine the past, and remember the future without realizing it.¹³ In other words, our military tends to predict future events based upon flawed reasoning where we misunderstand past events. Yet, our longing

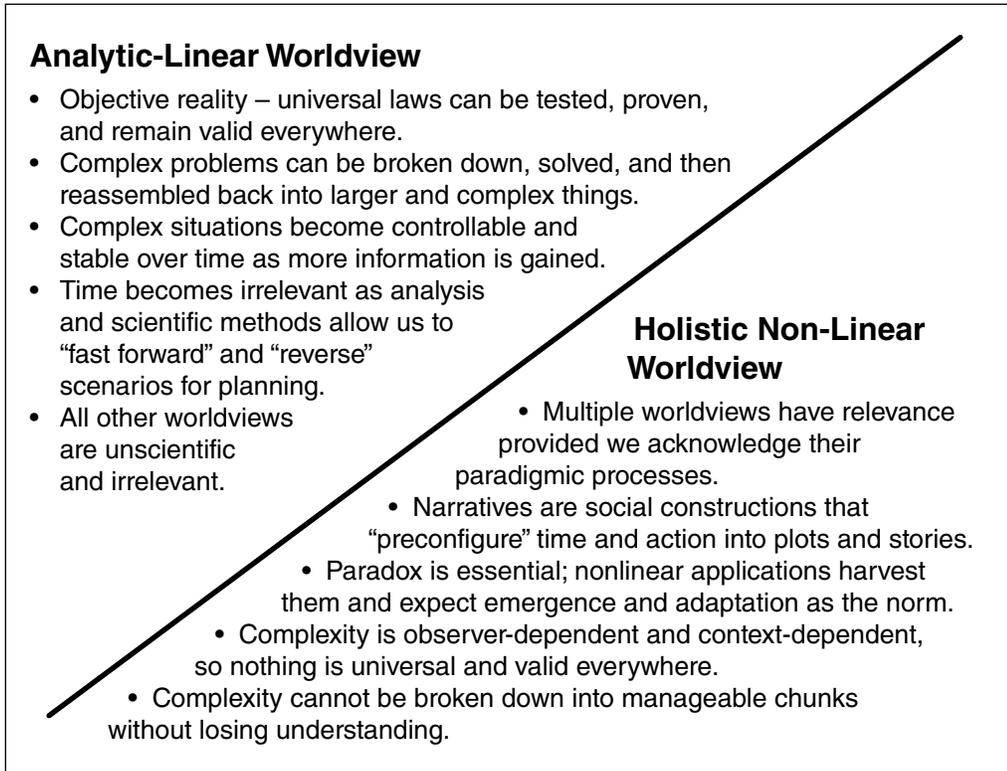


Figure 1: Linear and Non-Linear Worldview Characteristics

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for certainty and our preference for the analytic approach to sense-making crafts our entire planning methodologies, doctrine, and practices into a rather limiting linear production.¹⁴ Our inability to see alternative ways of strategizing occurs because of the seductive nature of analytic and linear constructs for military organizations.

Figure 2 illustrates the sequential process where military planners take the guidance from higher authorities and craft a 'desired end state' in the nebulous future.¹⁵ Working in *reverse-engineering* fashion, we subsequently construct the campaign plan backwards from this future end-state, crafting objectives, effects, centres of gravity, and elaborate lines of effort back to the present date.¹⁶ Each line of effort gets a myriad of metrics (differentiated between measures of performance and measures of effectiveness), as well as decision points sprinkled upon them within projected time and space. Once complete, we implicitly expect a complex, dynamic conflict environment to obey this plan (with branch plans accepted for major predicted developments). We expect that over time, we will gain more information and become more precise, with less surprise and increased control and stability. Progression through analytical planning promises us greater certainty and less of the 'open-endedness' of chaos and complexity.¹⁷ Supposedly, things get better over time, as long as the flood of data continues to feed the analytic-linear world view.

These linear and reverse-engineered approaches function from the highest strategic levels down to the immediate tactical level in what planners term a 'nested' approach. Even the concept of 'levels of war' is an abstraction within that particular world view, as are 'centres of gravity' and 'lines of effort.' Yet, repeatedly in multiple military conflicts, this purely analytical and linear approach often fails to make useful sense of reality. More often than not, we are surprised at things emerging in ways we did not expect, be they political developments, military coups, the assassination of an ambassador, or the sudden rise of a new adversarial force. While our analysts quickly rationalize continuing with the same concepts using 20/20 hindsight for new justifications, there seems to be a pattern of our continued surprise at linear strategies going 'off the rails' rather quickly.¹⁸

Confronting planning failure, the initial reaction is to re-configure the methodology, or adjust the familiar tools (lines of effort, centres of gravity, end states) within the confines of the analytical approach.¹⁹ I term this the 'Jominian Hindsight' effect after the highly influential principles of war penned by 18th Century military theorist Antoine-Henri Jomini, although Jerome Bruner (psychologist) uses 'processes of inference' in a similar manner.²⁰ According to Jomini, a military leader would win any military conflict with the proper combination of his principles, be it mass

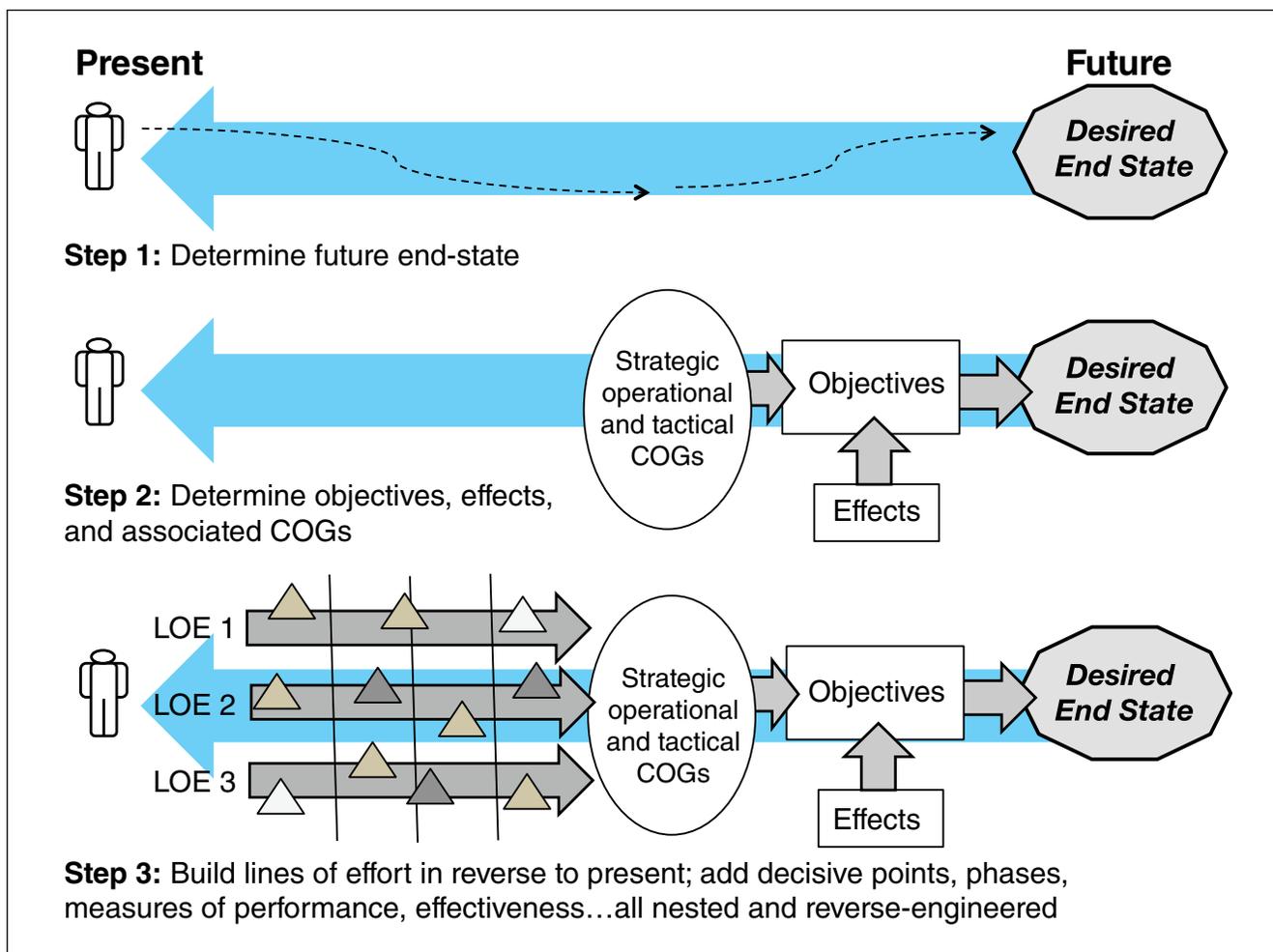


Figure 2: Analytic-Linear Worldviews and 'Reverse-Engineering' for Plans



Portrait of Antoine-Henri Jomini.

and surprise and speed, or perhaps x, y and z.²¹ If any commander applied them and failed, the 'Jominian Hindsight' responds with, "You did not apply my principles correctly." These endless cycles of methodological tinkering remain superficial, in that they fail to address the deeper issues that plague accurate sense-making and anticipation of complex military scenarios.²² We are most apt to critique (or fire) the military leader, fiddle with the methodology, and reboot with the same processes in play wearing slightly different clothing.

Thus, we become trapped in a world view where we argue over how the problems we will encounter must match the tools we are equipped with and unwilling to let go.²³ We want Russia to behave like the Soviet Union, and we expect ISIL to operate similar to al Qaeda or even Hamas. For the analytic-linear strategist, the tools can solve any problem, provided we match the right problem to the right tool. There are alternatives to this, if we are willing to break with our powerful institutionalisms.

How Does Non-Linearity Work in the Now-Now?

Although a controversial position, I view non-linearity as a concept that can function *within* the analytical world view, but also function distinctly *beyond* that world view.²⁴ Non-linearity need not conform to merely analytical processes; it can express existential, post-modernist, and constructivist worldviews that all are in conflict (and incommensurate) with

the analytical perspective. However, non-linear approaches cannot be 'broken down into manageable chunks' with the intent of re-assembling them into a linear sequence that maintains the essence of non-linearity. In other words, we cannot establish non-linear understanding of ISIL or Russia and then fracture it down into something linear without losing quite a bit (despite our institutional desires to do this very thing). Non-linearity resists analytical approaches, and subsequently must be appreciated outside of any world view that requires linear visualization for strategy. This requires patience and reflexivity, as well as a willingness to let go of cherished patterns for sense-making. We critically question *how* and *why* we employ end-states, lines of effort, and other linear constructs, and edit them frequently.

Consider once again the introductory quote from Mel Brooks' movie, as it provides useful metaphoric value in explaining non-linearity. The movie scene (for those unfamiliar) has the main villains searching for the heroes by using amazing and hilariously-paradoxical technology. Within the movie, they get an advanced copy of the movie before it is done being 'made.' Using it in a linear fashion with a VCR player, they simply fast-forward to the future point they need to gain information on the heroes, and then continue pursuit in a far more specific manner. Essentially, there is no difference between the movie on tape and reality for them within the movie. The video tape is not a 'crystal ball' or 'magic mirror,' but a measurable and predictive tool that eliminates uncertainty from the future for these characters that also recognize they are within that movie.²⁵

"Complex situations routinely reject linear thinking, yet our traditional linear planning methodology continues to plod along."

Metaphorically, this illustrates our tendency to construct elaborate linear strategies and expect a complex environment to match the plan as things unfold. Complex situations routinely reject linear thinking, yet our traditional linear planning methodology continues to plod along.²⁶ We publish our extensive campaign plans, operations orders, and subsequently manage their upkeep and relevance through a massive volume of data and metrics that somehow reinforce original concepts.²⁷ 'A does lead to B, which forms C' as we force observations and events to continue to support initial campaign intent and objectives. Sociologist Karl Weick explains: "Bureaucracies see what they have seen before and they link these memories in a sequential train of associations... [They] tend to imagine the past and remember the future."²⁸ This highlights a dangerous output of linear causality in that our military tends to predict future events, based upon flawed reasoning where we misunderstand past events.

Even the planning term 'course of action' implies a *direction to set our course with*, providing conceptual framework for linear visualization. We are a military institution desiring the infallibility of a copy of the movie within which we are currently inside, to aid us in predicting how to solve the problems we encounter. Instead of seeking to construct linear strategies where military forces simply 'connect the dots' from point-to-point and achieve planned end-states, we need to consider non-linear applications, and how they differ dramatically.

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Non-Linear Applications: Turning Squares into Lines

For strategic non-linear applications, we should consider that critiquing the traditional linear world view creates an implicit and powerful desire to fill the void with something similar. Henry Ford's maxim of "you can have a Model T in any color, as long as it is black" is analogous here. We do not willingly discard the linear construct where any potential replacement strategy must be pre-configured and forced to adapt linear processes (has to be black). This also generates strong institutional bias against world views and approaches that generate entirely novel and dissimilar strategies; threatening established doctrine and institutional traditions is quite dangerous.²⁹

The 'semiotic square' offers a useful non-linear construct for building strategies and exploring the interplay between conflicting world views.³⁰ By embracing paradox, conflicts and similarities, the strategist should remain reflexive to recognize institutionalisms and the different languages of distinct world views. There are numerous other approaches for non-linearity in strategy; however, for purposes of brevity, the semiotic square will suffice for this

article.³¹ Any non-linear approach including the semiotic square produces outputs that lack the systematic, 'if A then B' analytical content and form familiar in linear strategy-making.³² Non-linear strategy is *emergent*, not *prescriptive*. This aids in critiquing many linear planning concepts.

Figure 3 provides an illustration of how a semiotic square operates. There are several methods for employing semiotic squares, but all involve the critical element of paradox. Figure 3 seeks an 'A' notion where the 'B' is in paradox. Consider a common institution such as a bank to illustrate this process. Your bank wants customers to *save* their money in savings accounts so the bank has capital to use, which can represent the 'A' of Figure 3. Yet the bank also wants customers to *spend*, to take out loans so that the bank can profit off interest and transactions. The spending is 'B,' and is in tension with the thrifty nature of 'A'. A semiotic square builds upon this paradox by inviting notions of 'both A and B,' as well as 'neither A nor B' in opposing corners. Paradox builds upon paradox, and most banks feature a combination of contradictory objectives where customers need to save, invest, spend, and so on. Banks are a useful example for introducing how semiotic squares function, yet, can we offer a military example in strategy or planning?

In 2012, as a lead operational planner for NATO (NTM-A) in Afghanistan, I employed semiotic squares in several occasions for strategic and operational goals. In one case, we applied in the design portion of developing reduced Afghan Security Force projections for 2017 and beyond.³³ In another, semiotic squares were applied during initial design and sense-making for developing an overarching synchronization plan for NTM-A, transitioning all training bases and infrastructure to the Afghan Forces by 2014.³⁴ Figure 4 is a reproduction of the semiotic square used in the NTM-A transition planning. Here, primary colors work metaphorically by associating with each paradoxical construct. Notice that the square follows color theory for combining or eliminating colors. We applied these squares in theoretical strategic work for both the Boeing Company (a co-authored design chapter

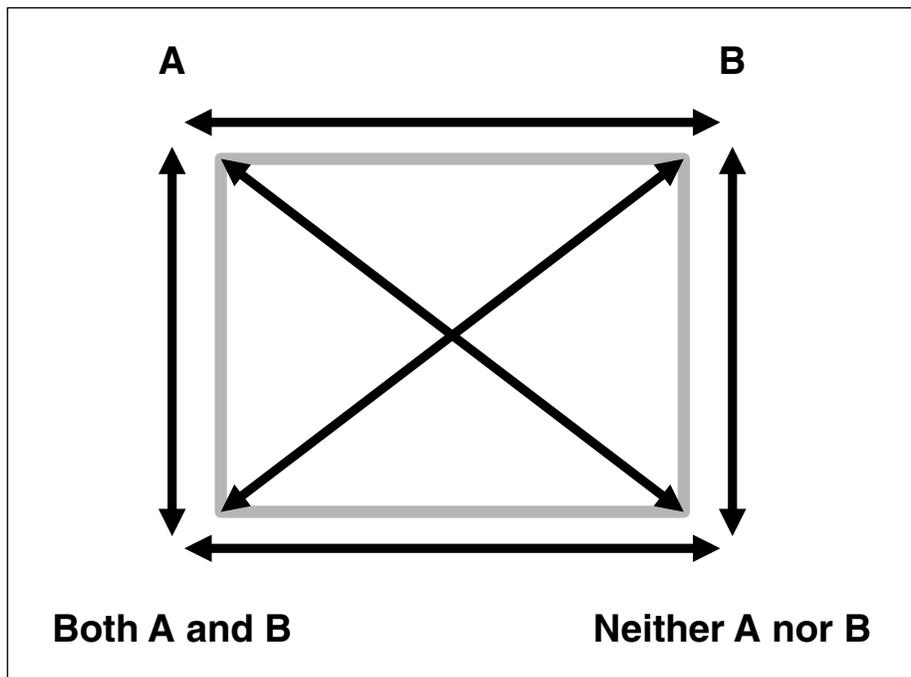


Figure 3: The Semiotic Square (non-linear approaches to planning)

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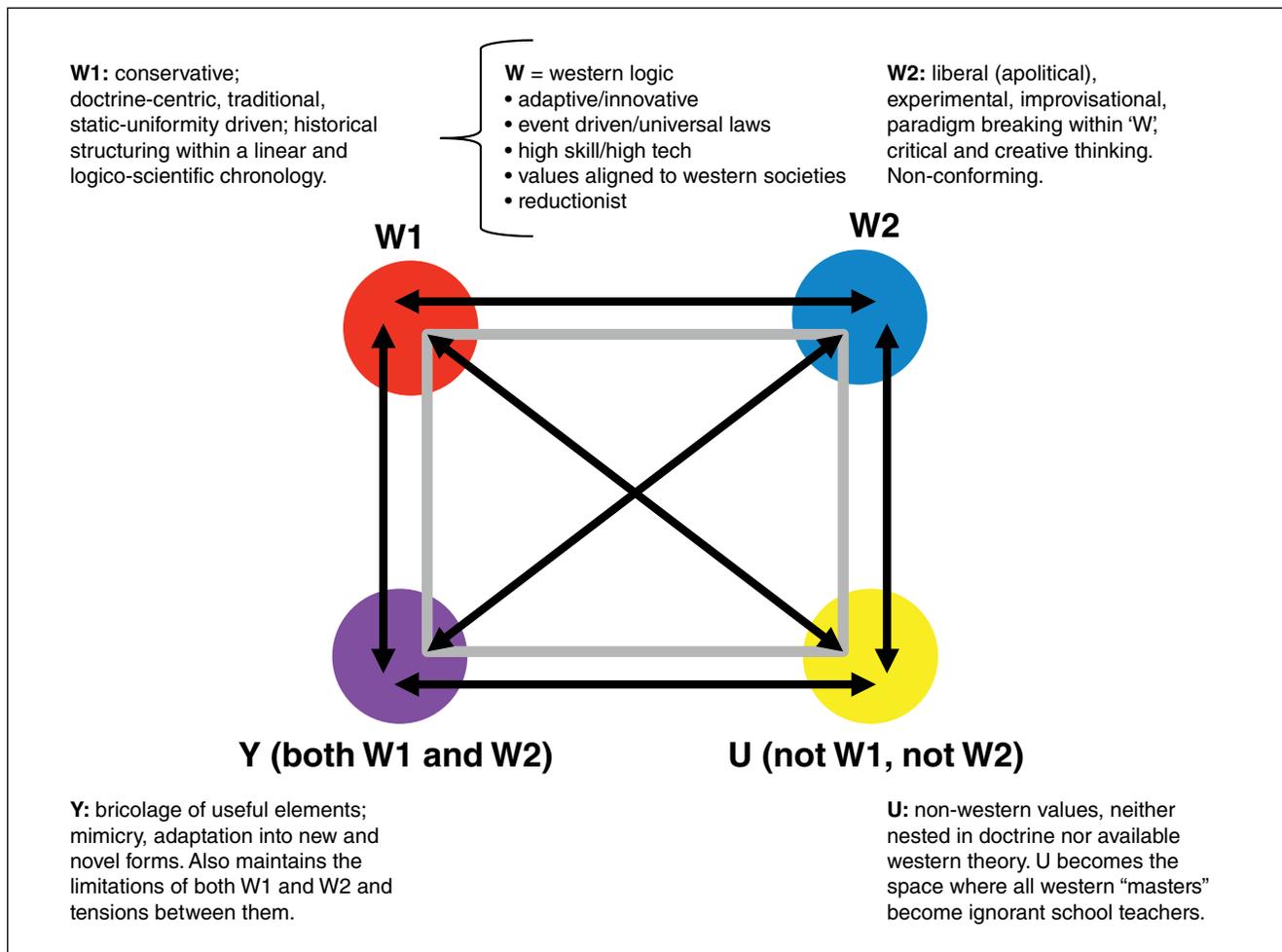


Figure 4: Applying the Semiotic Square within ISAF Strategic Planning (2012)

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for a book on emergent thinking) and a co-authored monograph offering various non-linear considerations.³⁵ Pursuing non-linear planning (in these situations with semiotic squares) before getting tangled in traditional linear causality offers strategists the ability to break out of the prescriptive and often limiting mindset that fails to appreciate complexity.

Semiotic squares are an example of non-linear planning, yet they have, by lacking the familiarity of linear sequencing, major conceptual hurdles to overcome for any future in wider applications. The squares aid in generating a deeper understanding of multiple world views, the tensions between them, and insight into how a complex environment functions. However, without the linear qualities, it is akin to directions on a map that do not get you from Point A to Point B. This will be troublesome for many, and rather repugnant to some. Non-linear outputs generate narratives and rich pictures, but these also cannot fill the conceptual void where linear planning functions.³⁶ In order to nudge an organization toward truly non-linear critical thinking, they must be willing to be highly critical of cherished linear tools (at least for strategic considerations). Subsequent operational and tactical level linear plans ought to feature those familiar concepts, as tactical applications routinely require linear and analytical content and form.

Non-Linear Applications and Integration

At the tactical level, modern military organizations still demand a largely linear and highly analytical output in order to synchronize military action.³⁷ This is not only a result of our organizational structure (hierarchical), but also the unfortunate dominance of the analytical worldview at every level of professional development and education.³⁸ Yet, at the strategic level, the benefits of non-linear approaches may exceed those that are strictly linear, particularly in the ongoing complex developments confronting western societies. This is a steep challenge to change strategic outlooks, because it threatens an entire world view that is entrenched across the entire political, educational, and professional disciplines.³⁹ Sadly, failure is the greatest teacher; continued strategic failures may open the door to exploring alternative concepts, such as non-linear approaches. Arguably, a fusion of strategic non-linear thinking with interplay between that world view and the traditional linear approach for tactical applications may offer the best option. This article does not offer a checklist or guide book for what to expect in such a scenario, but there are a few landmarks to consider.

“At the tactical level, modern military organizations still demand a largely linear and highly analytical output in order to synchronize military action.”

First, the non-linear interplay should largely function at the strategic levels, and gradually evaporate at the tactical levels, with linear and analytical approaches operating in mirror fashion. Critical reflection is essential at every level of warfare, however, non-linear critical inquiry might function best at the strategic and operational levels where concepts often transcend tangible and explicitly defined characteristics.

Second, within what modern military doctrine terms the ‘operational level of war’ is where transitioning between non-linear and linear applications should occur. This makes for some very challenging intellectual ‘hoops for planners to leap through.’ These military professionals must therefore be proficient in critically approaching and challenging accepted linear processes and providing useful non-linear concepts. They also must be able to ‘interplay’ between them, working with paradox, conflicts, and compatibility issues, and producing relevant deliverables in both directions for both audiences. Our current professional education models are rather one-sided towards the analytical world view, creating planners that apply linear and analytical (quantitative) thinking at every level exclusively. When we do float the term ‘non-linear,’ we do so often in confusing or misapplied ways that pervert the meaning.

Third, no world view should dominate the institution, or any subordinate organization. A single world view creates imbalances and fractures the ability for interplay between two different ways of interpreting complexity. But the mere suggestion of this will ‘upset many apple carts,’ as entire organizations have established powerful fiefdoms within our military

organizations where the sole world view must employ linear and analytical processes.

Conclusions

We can nudge the institution away from devote or exclusive linear thinking. This makes for great debate and reflexive thinking. This requires not only profound institutional change for the military at every level, but sensitive and knowledgeable caretakers at each level that prevent these institutionalisms from wreaking havoc.⁴⁰ We need to recognize how our military institution remains rather seduced by analytical approaches for every-and-all problems. Linear logic, coupled with a flawed appreciation towards complexity makes for reverse-engineered approaches for planning at the strategic, operational, and tactical levels. This works well enough for many simplistic and routine challenges, but forcing a ‘one size fits all’ cognitive framework upon all challenges does not prepare our military for success in the 21st Century.





NOTES

1. Rick Moranis and George Wyner, *Spaceballs*, DVD. Directed by Mel Brooks, Los Angeles: MGM/UA Home Entertainment 2000.
2. David Remnick, "Going the Distance: On and Off the Road with Barack Obama," in *The New Yorker*, 27 January 2014). Remnick quotes Obama's public assessment of radical Islamic groups such as ISIS in January where they are analogous to "if a [junior varsity] team puts on Lakers uniforms" prior to the rapid expansion of ISIS and the collapse of the Iraqi Army in the Spring of 2014. See also: John Crawley, "U.S. Intelligence under fire over Ukraine," (Washington: CNN, 5 March 2014). Richard Norton-Taylor, "Iraq, Syria, Libya, UK- Intelligence failures all," in *The Guardian*, 26 August 2014. Damian Paletta, Kristina Peterson, "Obama Says U.S. Intelligence Underestimated Islamic State Threat," in *The Wall Street Journal*, 28 September 2014. Last accessed on 29 September 2014 at: <http://online.wsj.com/articles/obama-says-u-s-intelligence-underestimated-developments-in-syria-1411918072>.
3. Jerome Bruner, *Actual Minds, Possible Worlds* (Cambridge, MA: Harvard University Press, 1986), p. 96.
4. Matthew Schmidt, "War as Political Work: Using Social Science for Strategic Success," (Fort Leavenworth, KA: *Military Review*, July-August 2014) p. 51. See also: Christopher Papparoni, *The Sociology of Military Science: Prospects for Postinstitutional Military Design* (Continuum, 2012), p. 36.
5. Antoine Bousquet, *The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity* (New York: Columbia University Press, 2009), pp.128-129. See also: Aaron Jackson, *The Roots of Military Doctrine: Change and Continuity in Understanding the Practice of Warfare* (Fort Leavenworth, KA: Combat Studies Institute Press, 2013), pp. 52-53.
6. Bruner, p. 97. On the notion of 'recursion,' Bruner writes: "It is impossible to account for thoughts on thoughts, thoughts on thoughts on thoughts, up to whatever level of abstraction is necessary."
7. Bousquet, *The Scientific Way of Warfare*, p. 56. "As the Enlightenment and Scientific Revolution took hold, reason and scientific method were recruited for the study and organization of all fields of natural phenomenon and human activity, including a quest for the discovery of the fundamental laws governing warfare." See also: Valerie Ahl and T.F.H. Allen, *Hierarchy Theory: A Vision, Vocabulary, and Epistemology* (New York: Columbia University Press, 1996), p. 1.
8. John Holland, "Complex Adaptive Systems," in *Daedalus* (Volume 121, Issue 1, Winter 1992), p. 17. See also: Antoine Bousquet, "Chaoplectic warfare or the future of military organization," in *International Affairs* (Vol. 84, No. 5, 2008) pp. 919-920.
9. Antoine Bousquet, Simon Curtis, "Beyond Models and Metaphors: Complexity Theory, Systems Thinking and International Relations," in *Cambridge Review of International Affairs* (Vol. 24, Issue 1, 2011), p. 55. See also: Bruner, pp. 48-53.
10. Aaron Jackson, *The Roots of Military Doctrine: Change and Continuity in Understanding the Practice of Warfare* (Fort Leavenworth, KA: Combat Studies Institute Press, 2013), p. 52. Jackson observes: "Mechanistic ideas, such as the 'linear battlefield,' continued to exist alongside other (newer and hence more prominent) ideas belonging to more recent scientific regimes, long after the mechanistic sciences had ceased to constitute the dominant regime."
11. Paul Ricoeur, *Time and Narrative*, Kathleen Blamey (Trans.), David Pellauer (Chicago: University of Chicago Press, 1985), pp. 68-90.
12. Hayden White, *The Content of the Form: Narrative Discourse and Historical Representation*, (Baltimore: John Hopkins University Press, 1990), pp. 40-43. White provides explanation on how we socially construct narratives to make sense of the past, present, and future. See also: Michel Foucault, *The Order of Things* (New York: Vintage Books (Vintage Books Edition, 1994) pp. 46-50.
13. Karl Weick, "The role of imagination in the organizing of knowledge," in *European Journal of Information Systems* (Volume 15, 2006), p. 448. See also: Haridimos Tsoukas, Efi Vladimirou, "What is Organizational Knowledge," in *Journal of Management Studies* (Vol. 38, No. 7, November 2001), p. 975.
14. Bruner, p. 93. While Bruner uses the fields of philosophy and psychology, I add the military discipline as another similarly positivist fixated institution here. Although psychology has moved on from positivism since the 1950s (Bruner describes the 'Cognitive Revolution' in Chapter 7), the military has not.

15. Antoine Bousquet, "Chaoplex Warfare or the Future of Military Organization," in *International Affairs* (Vol. 84, Issue 5, 2008), pp. 920-922. Bousquet describes earlier 'mechanistic warfare' as well as thermodynamic warfare and modern cybernetic warfare as all promising to control warfare through greater precision, science, meticulous plans, and technology.
16. Jack Kem, Campaign Planning: Tools of the Trade (Fort Leavenworth, KA: Department of Joint, Interagency, and Multinational Operations, March 2009), pp. 15-24. Kem's methodology for operational design demonstrates the 'reverse-engineering' aspect of military planning. See also: Jeff Conklin, *Wicked Problems and Social Complexity* (CogNexus Institute, 2008, at: <http://www.cognexus.org>, last accessed 20 September 2014), pp. 4-5; Jeffrey Reilly, *Operational Design: Shaping Decision Analysis through Cognitive Vision* (Maxwell Air Force Base: Department of Joint Warfare Studies, November 2009), pp. 14-23. Reilly's 'cognitive map' methodology, similar to Dr. Kem's approach, illustrates a reverse-engineered campaign plan where one begins with the desired end-state and military termination criteria.
17. Haridimos Tsoukas, *Complex Knowledge: Studies in Organizational Epistemology*, (Oxford: Oxford University, 2005) p. 293.
18. Remnick. See also: Alex Spillius, "George W. Bush says Iraq intelligence failure is his biggest regret," in *The Telegraph*, 1 December 2008. Last accessed on 29 September 2014 at: <http://www.telegraph.co.uk/news/worldnews/northamerica/usa/3540733/George-W-Bush-says-Iraq-intelligence-failure-is-his-biggest-regret.html>. Crawley, Norton-Taylor, Paletta and Peterson. All these reporters highlight the many intelligence failures and false predictions of enemy actors in 2013-2014 despite the advanced technology and vast resources of western intelligence services.
19. Michael Cohen, James March, Johan Olsen, "A Garbage Can Model of Organizational Choice," in *Administrative Science Quarterly*, (JSTOR, Vol. 17, No 1, March, 1972), p. 2. The authors outline decision-making stimuli in organizations in that an organization is "a collection of choices looking for problems..." Thus, how an organization self-identifies often determines what problems it seeks, and how it prefers to solve them. See also: Werner Stark, *The Sociology of Knowledge*, (London: Routledge & Kegan Paul, 1968), p. 16.
20. Bruner, pp. 89-92. Bruner observed subjects changing the definition when confronted with a 'wrong answer' during his experiment on guessing patterns of information based upon illustrations of social interactions. For the military, we tend to do the same with Jomini's principles of war in retrospect. There are also aspects of 'recursion' operating here, where we loop our logic back upon itself to form the foundation for further theorizing.
21. Antoine Bousquet, "Chaoplex Warfare or the Future of Military Organization," in *International Affairs* (Vol. 84, Issue 5, 2008), p. 919.
22. On issues between methodological and epistemological understanding, see: Catherine Hardy and Denise Tolhurst, "Epistemological Beliefs and Cultural Diversity Matters in Management Education and Learning: A Critical Review and Future Directions," (Academy of Management Learning & Education, Vol. 13, No. 2, 2014), p. 268.
23. Karl Weick, "Drop Your Tools: An Allegory for Organizational Studies," in *Administrative Science Quarterly*, (Vol. 41, 1996), p. 307.
24. I use the term 'world view' in this article instead of the more accurate yet less familiar term of 'paradigm.' For more on paradigms, see: George Ritzer, *Sociology: A Multiple Paradigm Science* (revised ed.), (Boston: Allyn and Bacon, 1980), p. 7. See also: Thomas Kuhn, *The Structure of Scientific Revolutions* (3rd ed.), (Chicago, University of Chicago, 1996), pp. 5-15. Peter Berger, Thomas Luckmann, *The Social Construction of Reality: A Treatise in the Sociology of Knowledge* (New York, Anchor Books, 1967), p. 59.
25. Another frequent Mel Brooks gag within this scene is how the characters repeatedly 'break the fourth wall' in theater. This term refers to when characters acknowledge they are inside a movie, and often address the audience directly. Philosophically, this does share aspects of inter-paradigmatic thinking, despite it being a fictional comedy. The characters, played by actors, admit to being 'within the movie,' while acknowledging the audience is there to continue to observe the movie that they are driving forward.
26. Ryan, King, Brusino, Cox, p. 249. See also: Jeff Conklin, *Wicked Problems and Social Complexity* (CogNexus Institute, 2008) p. 4. Azeem Ibrahim, Afghanistan's Way forward must include the Taliban, (*Los Angeles Times Opinion Online*, 9 December 2009). Last accessed on 9 December 2014 at: <http://articles.latimes.com/2009/dec/09/opinion/la-oe-ibrahim9-2009dec09>. Ibrahim quotes General McChrystal's opinion on the past decade in Afghanistan, "...looking at the war in simplistic Manichean terms—save as many good guys as possible while taking out as many bad guys as possible—was a mistake."
27. Antoine Bousquet, *The Scientific Way of Warfare*, pp.128-129. Bousquet discusses the evolution of military concepts from 'command' to 'command and control' where this suggests a process where the controller might capture all information from the environment, process it, and transmit it back in a 'feedback loop' that promises total control of a battlefield with predictability and precision. For a discussion about applications of this concept to military doctrine, see: Aaron Jackson, *The Roots of Military Doctrine: Change and Continuity in Understanding the Practice of Warfare* (Fort Leavenworth, KA: Combat Studies Institute Press, 2013), pp. 52-53.
28. Karl Weick, "The role of imagination in the organizing of knowledge," in *European Journal of Information Systems* (Volume 15, 2006), p. 448. See also: Haridimos Tsoukas, Efi Vladimirov, "What is Organizational Knowledge," in *Journal of Management Studies* (Vol. 38, No. 7, November 2001), p. 975.
29. Shimon Naveh, Operational Art and the IDF: A Critical Study of a Command Culture, (Center for Strategic & Budgetary Assessment (CSBA), contract: DASW01-02-D-0014-0084, 30 September 2007), p. 3. Naveh describes how Systemic Operational Design (SOD) was not well received by the Israeli military institution, due to similar anti-intellectualism and self-preservation processes. See also: John Nagl, *Learning to Eat Soup with a Knife: Counterinsurgency Lessons from Malaya and Vietnam* (Chicago: The University of Chicago Press, 2002), p.9.
30. Majken Schultz, Mary Jo Hatch, "Living with Multiple Paradigms: The Case of Paradigm Interplay in Organizational Culture Studies," in *The Academy of Management Review*, (Vol. 21, No. 2, 1996), p. 536.
31. Others include John Boyd's OODA loop (observe-orient-decide-act), the scenario planning quadrant chart modeling developed by Shell Oil Company in the 1970s, and post-modernist 'assemblages' first proposed by Gilles Deleuze and Felix Guattari. See: Ben Zweibelson, "Breaking Barriers to Deeper Understanding: How Post-Modern Concepts Are 'Value-Added' to Military Conceptual Planning Considerations," in *Small Wars Journal*, 21 September 2011, at: <http://smallwarsjournal.com/jrnl/art/breaking-barriers-to-deeper-understanding-how-post-modern-concepts-are-value-added> to-mil. Last accessed 26 August 2014. See also: Ben Zweibelson, Grant Martin, Christopher Papparoni, "The Times They are a-Changin'...Are We?" in *Millennial Spring: Designing the Future of Organizations*, Miriam Grace (ed.), George Graen, (Information Age Publishing, 2014). Ben Zweibelson, Grant Martin, Christopher Papparoni, "Frame Reflection: A Critical Review of U.S. Military Approaches to Complex Situations," OODA Loop (12 September 2013), p. 23. Retrieved on 15 November 2013 at: http://www.oodaloop.com/featured/2013/09/12/frame-reflection/#_methods=onPlusOne%2C_ready%2C_close%2C_open%2C_resizeMe%2C_renderstart%2Cconcircle%2Cdefresh%2Cerefresh%2Conload&id=I1_1384528283461&parent=http%3A%2F%2Fwww.oodaloop.com&pname=&rptoken=51509055.
32. Bousquet, "Chaoplex Warfare or the Future of Military Organization," p. 924.
33. Ben Zweibelson, "Does Design Help or Hurt Military Planning: How NTM-A Designed a Plausible Afghan Security Force in an Uncertain Future," Part I and Part II, in *Small Wars Journal*, July 2012.
34. Ben Zweibelson, Breaking Barriers to Deeper Understanding: How Post-Modern Concepts Are 'Value-Added' to Military Conceptual Planning Considerations, in *Small Wars Journal*, 21 September 2011, at: <http://smallwarsjournal.com/jrnl/art/breaking-barriers-to-deeper-understanding-how-post-modern-concepts-are-value-added> to-mil. Last accessed 26 August 2014.
35. Zweibelson, Martin, Papparoni, "The Times are a-Changin'." See also: Zweibelson, Martin, Papparoni, "Frame Reflection."
36. Bruner, pp. 42-43. See also: Paul Ricoeur, *Time and Narrative*, Kathleen Blamey (Trans.), David Pellauer (Chicago: University of Chicago Press, 1985), p. 78. Hayden White, *The Content of the Form: Narrative Discourse and Historical Representation*, (Baltimore: John Hopkins University Press, 1990), pp. 40-43.
37. Although I do not think that we should always revert to linear and analytical outputs, I stress that this must occur within the current military institution for lack of alternatives. Tomorrow's military may not be as tightly wedded to the logico-scientific paradigm and function even tactically without current linear procedures.
38. Karl E. Weick, "Improvisation as a Mindset for Organizational Analysis," *Organizational Science* (Volume 9, No. 5; September-October 1998), p. 551. Organizations follow "the chronic temptation to fall back on well-rehearsed fragments to cope with current problems even though these problems don't exactly match those present at the time of the earlier rehearsal."
39. Karl Weick, "Drop Your Tools: An Allegory for Organizational Studies," in *Administrative Science Quarterly*, (Vol. 41, 1996), p. 307. Weick uses the metaphor of firemen 'dropping their tools' as a metaphor for adaptation of organizations. On failure, he writes: "To drop one's tools may be to admit failure. To retain one's tools is to postpone this admission and to feel that one is still in it and still winning."
40. Horst Rittel, Melvin Webber, "Dilemmas in a General Theory of Planning," in *Policy Sciences* (Volume 4, 1973), p. 162. See also: Karl Weick, "Rethinking Organizational Design," in *Managing as Designing*, Richard Boland Jr (ed.), Fred Collopy, (California: Stanford Business Books, 2004), p. 42.