

Beyond Hagiography

Theoretical and Practical Problems in the Works and Legacy of John Boyd

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John Boyd was an intense man, of intense views, with a lasting and intense following. The distinguished strategist Colin Gray puts Boyd with “at least an honorable mention” amongst Bernard Brodie, Edward Luttwak, Basil Liddell Hart, and John Wylie as one of the best strategists of the 20th Century.¹ If Boyd is best to be remembered widely as the progenitor of the OODA (Observe-Orient-Decide-Act) Loop, then his legacy has held up well. Many important military organizations, including the US Army, US Navy, US Marine Corps, US Air Force, the British Armed Forces, and the Swedish Armed Forces, incorporate the concept of the decision cycle in their doctrines;² effectively, “OODA is everywhere in our theory, doctrine, and force structure planning.”³ And for all that the USAF is often lamented by Boyd's supporters as a place where its own offspring's ideas are yet to take root, it is notable that the current commander of the Air University, a lieutenant general, as a major at the same institution wrote his master's thesis as a comparison of John Boyd to another famous USAF strategist, John Warden.⁴

But as noted by Frans Osinga, the great explainer of Boyd's somewhat inscrutable briefings, from time to time “his work has invited dismissive critique.”⁵ David Mets of the Air Force Research Institute is a notable critic; he asserts that Boyd's “notions remain too vague to amount to anything other than a moving target of little use in structuring a debate or attempting to educate one's mind on the nature of war before arriving at the battlefield.”⁶ And for all the enthusiasm for his work in the USMC, there are many officers in other services who have only heard of him, who are only vaguely familiar with his work, who have trouble identifying the four phases of the OODA Loop, and who doubt how useful all of that can really be. In my brief and informal survey of US Army War College Fellows recently in residence at the University of Texas at Austin, three of four had never heard of him, and the fourth couldn't remember why he had.

If, then, Boyd is at once extolled and dismissed, yet not widely read or understood, the propagation of his ideas must be problematic, for both admirers and detractors. As Boyd inspires in many ways, it seems reasonable to ask whether identifying those problems can

¹ Colin Gray, *Modern Strategy* (Oxford University Press, 1999), pp. 90–91.

² Berndt Brehmer, “The Dynamics OODA Loop: Amalgamating Boyd's OODA Loop and the Cybernetic Approach to Command and Control,” 10th International Command and Control Research and Technology Symposium, San Diego, 15–17 June 2004.

³ David J. Lyle, “Looped Back In: We've Been Using the Wrong OODA Picture,” *Armed Forces Journal*, December 2011, p. 32

⁴ David S. Fadok, *John Boyd and John Warden: Airpower's Quest for Strategic Paralysis* (Maxwell AFB: School of Advanced Airpower Studies, 1994).

⁵ Frans P.B. Osinga, *Science, Strategy, and War: the Strategic Theory of John Boyd* (New York: Routledge, 2007), p. 1.

⁶ David Mets, “Boydmania,” *Air and Space Power Journal*, vol. 18, no. 3 (Fall 2004).

improve the theory and its retelling. In attacking this question, I admit that I must subject Boyd to tests his historical predecessors never faced. Few ask to see Clausewitz's data set. No one wonders about Sun Tzu's regression analyses. Even Hans Delbrück didn't really face peer review. But posthumously, they all do—social science evolved remarkably during Boyd's lifetime, and we do expect better today. When asking whether a particular set of strategic views is worth studying, we do subject that canon of thought to rigorous analysis. If we didn't, we would have no idea whether to pay attention to it.

For Boyd's theories to be worth studying and propagating, they should have descriptive, explanatory, or predictive power. I accept up front that building and widely propagating a generally accepted theory of strategy can itself alter the strategic landscape, as actors who study it may eventually adapt to it. Thus, as Osinga puts it, “with war and strategic behavior so fundamentally in flux, strategic theory cannot aspire to high standards of parsimony or general applicability and validity, nor one that holds out over a long period of time.”⁷ Prediction, particularly of Berra's type, will consequently be very difficult.

But even if most strategic theories fail in predictive power, descriptive and explanatory power, they can still have great pedagogical utility, and we should demand this from theories of things military.⁸ Boyd's “Organic Design for Command and Control” or any other briefing should only be preferable to the alternatives if it has greater explanatory power regarding historical advantage in war, the subject with which he most concerned himself. Even here, though, it can be hard to discern from Boyd's parsimonious text what he intended. The secondary evidence suggests that he had lofty goals for applicability in both description and explanation. His theories themselves do not appear parsimonious; he himself repeatedly exclaimed “whole brief, or no brief.”⁹ But parsimony is not the same as leverage,¹⁰ and with the sweep of his arguments, he does seem to have been aiming to explain all of known military history with a relatively singular theory of considerable abstraction.

Problems of epistemology: the Entropy-Incompleteness-Uncertainty argument

This gets to the first category of problems with Boyd's work—its essential epistemology. As an explanation for the course of military history, Boyd's work can appear to be a Theory of Everything. TOEs are alluring: Hilbert, Russell, Whitehead, and a host of modern physicists have aimed for them. But even as Boyd would likely admit, “contrary to the thinking of both Laplace and Hegel, all things in the universe cannot be derived from one another with ineluctable necessity.”¹¹ This is no pontification, but the essence of Boyd's invocation of Gödel's Incompleteness Theorem in support of his arguments. Moreover, this is about the physical

⁷ Frans Osinga, “On Boyd, Bin Laden, and Fourth Generation Warfare as String Theory,” pp. 168–197 in John Adreas Olson, ed., *On New Wars*, Oslo Files on Defense and Security #4 (Oslo: Norwegian Institute for Defense Studies, 2007), p. 172.

⁸ John C. Garnett, *Commonsense and the Theory of International Politics* (London: MacMillan, 1984), p. 46.

⁹ Winslow T. Wheeler, “Some Lessons From the Dustbin of History,” in Winslow T. Wheeler and Lawrence J. Korb, eds., *Military Reform: A Reference Handbook* (Westwood: Praeger, 2007).

¹⁰ Andrew L. George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge: MIT Press, 2005), p. 114.

¹¹ Joseph Cardinal Ratzinger, *In the Beginning* (Grand Rapids: William B. Eerdmans Publishing, 1995), p. 54.

sciences, not the practice of strategy. For as Osinga puts it, “there is no single, all-embracing formula explaining, describing, and predicting strategy and its outcome. Instead, it belongs in the domain of social science, in which parsimony is only occasionally appropriate.”¹²

Where was Boyd at his most parsimonious? Possibly in his nearly novel harnessing of the rules of the physical sciences in support of his analysis of inherently social phenomena. It is certainly true that Thomas Kuhn and Joseph Schumpeter had “recognized the destructive side of creativity.”¹³ And it is notable that Jacob Bronowski had earlier thought about the connections amongst Rudolf Clausius's Second Law of Thermodynamics,¹⁴ Gödel's Proof, and Heisenberg's Principle.¹⁵ But Boyd is said to have been unique in his explanation of how the creative process is grounded in the fundamentals of entropy, incompleteness, and uncertainty. “Taken together,” he asserted, “these three notions support the idea that any inward-oriented and continued effort to improve the match-up of concept with observed reality will only increase the degree of mismatch.”¹⁶

If they support the idea, they hardly prove it. Heisenberg's Copenhagen Interpretation of quantum mechanics theory is not universally accepted by either physicists or philosophers.¹⁷ Moreover, as E.T. Jaynes wrote in his classic exposition on the question, “there is no line of argument proceeding from the laws of microscopic mechanics to macroscopic phenomena that is generally regarded by physicists as convincing in all respects.”¹⁸ So, without evidence, it may be more than a stretch to think that micro-physical phenomena are generalizable to macro-social phenomena. If it is a stretch, then selective quotation from natural science just makes for social pseudoscience. The obscurantism may have been unconsciously intentional for the combative Boyd. The approach, that is, has the ring of John von Neumann's advice to Claude Shannon about his theory of uncertainty in information. “Why don't you call it *entropy*?” he advised; “no one understands entropy very well, so in any discussion you will be in a position of advantage!”¹⁹

Moreover, at its core, this view is argument by analogy. Boyd was a big enthusiast of inductive thinking, but as Sir Karl Popper simply put it, “induction is unsafe.”²⁰ It is important for

¹² Osinga, *Science, Strategy, and War*, p. 11.

¹³ Robert Coram, *Boyd: the Fighter Pilot Who Changed the Art of War* (Boston: Little, Brown & Company, 2002), p. 326.

¹⁴ Rudolph Clausius, *The Mechanical Theory of Heat* (London: Jan van Voorst, 1867).

¹⁵ See Jacob Bronowski, *The Origins of Knowledge and Imagination* (New Haven: Yale University Press, 1979).

¹⁶ John Boyd, *Destruction and Creation*, briefing, 3 September 1976, p. 1.

¹⁷ Max Tegmark, “The Interpretation of Quantum Mechanics: Many Worlds or Many Words?,” *Fortschritte der Physik*, vol. 46, nos. 6–8 (November 1998), p. 855.

¹⁸ Edwin Thompson Jaynes, “Information Theory and Statistical Mechanics,” *The Physical Review*, vol. 106, no. 4 (May 1957), p. 620.

¹⁹ John Avery, *Information Theory and Evolution* (World Scientific Publishing Company, 2003), p. 81; the work was subsequently published in Claude E. Shannon, “A Mathematical Theory of Communication,” *Bell System Technical Journal*, vol. 27, nos. 3, 4 (July, October 1948), pp. 379–423, 623–656.

²⁰ Jim Storr, “Neither Art Nor Science—Toward a Discipline of Warfare,” *Royal United Services Institute Journal*, vol. 146, no. 2 (April 2001), p. 39.

pointing the initial way to scientific progress, but all progress, in Kuhn's admittedly differing paradigm, at best provides an approximation of reality.²¹ Today's scientific *Weltanschauung* is assuredly wrong, just as Newton's was, good approximation though it remains for many purposes. Thus, Boyd cannot claim certainty from his Gödel-Heisenberg-Clausius argument—not without a great deal more work to prove the case. Indeed, it is possible that such indeed disparate ideas cannot synthesize to anything. Boyd's appeal to uncertainty seems forcefully advanced, but without any such admission of such uncertainty in the argument itself.

It is also possible that none of this matters. This is social science, and that branch of inquiry is governed by different standards. Social phenomena are often more statistical than deterministic, and thus “uncertain inferences are every bit as scientific as more certain ones, so long as they are accompanied by honest statements as to the degree of uncertainty entailed in each conclusion.”²² This question of how to identify Rumsfeldian “knowable knows” is important. Boyd could have more usefully cited, say, F.A. Hayek's arguments from the Socialist Planning Debate of the 1940s.²³ So, if Boyd's military theories are sound, then we could move past the problem, treating this as an unnecessary (if wayward) justification, and ask whether the operationalized ideas actually hold.

Problems with theory—abstraction from the tactical to the strategic

Boyd's work is supposedly backed by the seven years he spent after retirement in his “self-imposed exile,”²⁴ the “in-depth review of military history” and all sorts of social and physical science, which distilled his “eclectic and esoteric”²⁵ thoughts into his epic deck of slides. There are many minor problems with his work, none of which are fatal, but there is a major one as well.

It is probably a minor issue that Boyd's views of Clausewitz, by his reading of *Vom Krieg*, were not quite fair. Consider first his irritation that Clausewitz may have “emphasized methods and routine at the tactical level.”²⁶ This is not the big message of the book, but even if it were, was there a better way of operating tactically in the smoothbore and black-powder era? Frederick's Prussians fired faster, marched faster, and held their lines better; that was a major part of their victories. *Aufstragstaktik* was a brilliant and enduring development, but it only became necessary on the more spacious battlefields of the mid-nineteenth century.²⁷

²¹ Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).

²² Gary King, Robert O. Keohane, and Sidney Verba, “The Importance of Research Design,” *American Political Science Review*, vol. 89, no. 2 (June 1995), p. 476–77.

²³ See, for example, Friedrich A. Hayek, “The Use of Knowledge in Society,” *American Economic Review*, vol. 35, no. 4 (September 1945), pp. 519–30.

²⁴ Coram, p. 6.

²⁵ Fadok, p. 14.

²⁶ Grant T. Hammond, *The Mind of War: John Boyd and American Security* (Washington DC: Smithsonian Institution Press, 2001), p. 129.

²⁷ Marco Sigg, “Aufstragstaktik—Is It Still Relevant?” *Military Simulation & Training Magazine*, September-October 2011, p. 18.

Boyd further thought that Clausewitz always considered the enemy's center of gravity to be its center of mass.²⁸ This is not quite so: sometimes it would be the enemy's alliance; sometimes it would be the opposing government's sentiments about the war.²⁹ The stratagem in ploy would depend on whether the protagonist was pursuing a *Vernichtungsstrategie* (of annihilation) or an *Ermattungsstrategie* (of attrition).³⁰ Ignoring this, Boyd just argued simplistically that Clausewitz's theories had led directly to the bloodbath of the First World War.³¹ It is probably enough to say that such is just not a modern reading of history—who would claim, in reviewing their patterns of action, that Haig or Foch or Ludendorff held genuinely Clausewitzian views?

But we should also remember Clausewitz for who he was. His writings contained quite a few contradictions, and elsewhere defined a longer list of possibilities. This should not be surprising, as his *magnum opus* was never properly reviewed in its entirety, and was only completed by his widow after his death. More importantly, we should remember that personal experience often shapes views of strategic theory. The *zeitgeist* of any particular period can easily infuse strategists' work. Clausewitz and Jomini clearly wrote as officers of the Napoleonic Wars, and the latter with the “Laplacian determinism” that dominated scientific discourse in the late 18th and early 19th centuries.³² Corbett and Mahan were naval officers, but academics as well, born of an era of imperial responsibilities. Liddell Hart and Fuller were clearly shaped by their experiences on the ground in the Great War. Douhet and Mitchell were fairly obviously air commanders in that episode, and were taken with rising enthusiasm for industrial technology in the 1920s.

Boyd quite clearly wrote from his experiences as a fighter pilot and instructor of fighter pilots. Generalization, he seems to have known, requires a lot of data, and thus he read a lot of history. But here we find the major problem: to generalize at the grand strategic level of all warfare from the tactical requirements of aerial dogfighting is a considerable leap.³³ The processes, the geographies, the timelines, the actors, the objectives, the political considerations—almost everything is different. If abstraction on this scale, from tactical to strategic theory—as induction from physical to social sciences—is to be revealed as valid, then that validity must be evidentiary.³⁴ Otherwise, it is at best polite dinner conversation.³⁵

²⁸ Carl von Clausewitz, *On War*, Michael Howard and Peter Paret, trans. (Princeton: Princeton University Press, 1989) p. 595.

²⁹ Clausewitz, p. 94.

³⁰ See Hans Delbrück, *History of the Art of War*, Walter J. Renfroe, trans., reprint edition (Lincoln: University of Nebraska Press, 1990), 4 volumes.

³¹ Coram, p. 333.

³² Osinga, *Science, Strategy and War*, p. 17.

³³ R.I. Bateman III, “Avoiding Information Overload,” *Military Review*, vol. 78, no. 4 (August 1998), pp. 53–58.

³⁴ This is one way of defining the difference between tactics and strategy. Alternatively, we might call strategies *conceptual* schemes for making progress towards goals, and tactics *concrete* one, whatever the level of command. See Huba Wass de Czege, “Operational Art: Continually Making Two Kinds of Choices in Harmony While Learning and Adapting,” *Army*, vol. 61, no. 9 (September 2011), p. 48.

³⁵ I thank Michael Villarreal of the LBJ School at the University of Texas at Austin for this observation.

Problems of evidence: three dates on a slide

Boyd's great briefing *Patterns of Conflict* purported to offer that evidence, and on its surface, it is “a real tour de force.”³⁶ I have noted that it is an inductive work of case study. I must also admit that theory-building from case study works well. This is because “creative insight often arises from juxtaposition of contradictory or paradoxical evidence,” and because the emergent theory is likely to be testable, as it emerged directly from a subset of the universe of possible data.³⁷ The catch is that further study of that wider universe is needed for refinement and testing, even if that is with further casework instrumental to the proof.³⁸

According to Hammond, Boyd “was a true scientist, always testing hypotheses and revising them before constructing a theoretical compression of what he had learned.”³⁹ This may have been true about his work on air-to-air combat, where he had ample opportunity to test tactics. But it is hard to see how this was true about his research, at least from the residue of his scant writings. They weren't empirical; rather, they were methodologically Mahanian. The great naval strategist openly admitted that he favored “artistic grouping of subordinate details around a central idea” lest the writer's “passion for certainty lapse into incapacity for decision.”⁴⁰ Boyd's approach, his in-depth review, appears to have covered the big, decisive battles and campaigns of history. This leaves aside consideration of much of the preparation for war, such as recruiting, training, personnel administration, logistics, or industrial planning. Boyd may have provided advice applicable to these areas, but he focused far more on how his ideas should be applied *in bello* than *ad bellum*. That was a conscious polemic choice of Boyd the writer, as it was with Mahan. For a commander, it is a sound approach in the heat of battle, but it is hardly sound historiography.⁴¹ Thus, it is unsurprising that within the sum of the cases of the those big battles, Boyd's evidence is somewhat suspect. The specific problems are of three types:

Omitted variable bias. Boyd repeatedly asserted that victors were victorious because they operated inside their opponents' decision cycles. For all the mathematics that he mastered in his work on energy-maneuverability theory, Boyd never explicitly modeled the variables and processes of his OODA Loop, and left it, as Tim Grant and Bas Kooter argue, with some serious shortcomings as a control theory. OODA, they observe, offers no guarantee of scalability; no

³⁶ Maj. Gen. Jack N. Merritt, commander of the Army War College, in the *Washington Post*, 4 January 1981; cited in James G. Burton, *The Pentagon Wars: Reformers Challenge the Old Guard* (Annapolis: Naval Institute Press, 1993), p. 53.

³⁷ K. Eisenhardt, “Building Theories from Case Study Research,” *Academy of Management Review*, vol. 14, no. 4 (October 1989), pp. 546, 547.

³⁸ Robert E. Stake, “Case Studies,” in Norman K. Denzin and Yvonna S. Lincoln, *Strategies of Qualitative Inquiry*, 3rd edition (Sage Publications, 2007).

³⁹ Hammond, p. 35.

⁴⁰ Alfred Thayer Mahan, “Subordination in Historical Treatment,” pp. 245-72 in A.T. Mahan, *Naval Administration and Warfare: Some General Principles, and Other Essays*, (Boston: Little, Brown, 1918), pp. 263, 261. Philip Crowl made this point about Mahan in “Alfred Thayer Mahan: The Naval Historian,” pp. 444-77 in Peter Paret, Gordon Craig, and Felix Gilbert, eds., *The Makers of Modern Strategy: Machiavelli to the Nuclear Age* (Princeton: Princeton University Press, 1986), p. 454; as did Geoffrey Parker in *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800* (Cambridge: Cambridge University Press, 1996), p. 82.

⁴¹ This makes it all the more interesting that Mahan's aforementioned paper was initially his presidential speech to the American Historical Association (26 December 1902).

modeling of the interactions of the loop with those of the enemy (who “gets a vote,” in today's parlance); no modeling of cooperative decision-making with friendly entities; no concepts of attention, memory, learning, or forgetting; and no reference to a deliberate planning process, as most wars last at least a few days.⁴² It is not even obvious that the cycle should start with OO.⁴³

Storr goes further, asserting that “an empirical thinker must reject the OODA Loop, since it does not adequately describe the known facts.”⁴⁴ Consider, as one example, Boyd's assertion that Genghis's Mongols conquered much of Asia because they were operating inside their enemies' decision loops. How could Boyd make that assertion without knowing what the enemies were thinking? For all we know, some other, omitted variable or set of variables accounted for the Mongols' successes. The historical record from the 12th Century is inadequate for asserting an explanation of such leverage, and Boyd never acknowledges the challenge.

Selection Bias. “Why,” Boyd asks in *Patterns of Conflict*, “have blitz and guerrilla tactics been so successful?”⁴⁵ It would be a good question if they had been, but in actuality, they have not. In his table on “Blitzkrieg, 1939–1973,”⁴⁶ Boyd lists his supporting case studies as simply “1940”, “1951”, and “1976”. While the initial German and North Korean attacks were impressive, most of the engagements of the Second World War and the Korean War were battles of attrition. The inclusion of the Entebbe Raid is a curious citation; as noted below, at least one other famous and daring hostage rescue was a fiasco. In his table on “Guerrilla Wars, 1775-1975,”⁴⁷ Boyd hardly lays out the sum of experience, again arguing that “it would seem that guerrilla strategy and tactics have been very successful.”⁴⁸ Here again, history suggests otherwise. Most insurgencies in the 20th Century have been flamingly unsuccessful, particularly if one counts the insurgencies that never got off the ground.⁴⁹ Boyd is cherry-picking his cases from amongst the big successful ones that attract attention—as they did for Boyd in his work. He undertakes no serious analysis of the set; he provides no “thick description” of any single one.⁵⁰ He just asserts that in sum they support his case.

⁴² Tim Grant and Bas Kooter, “Comparing OODA and Other Models as Operational View C2 Architecture,” 10th International Command and Control Research and Technology Symposium (San Diego, 13-16 June 2005).

⁴³ Kevin Benson and Steven Rotkoff, “Goodbye OODA Loop: A complex world demands a different kind of decision-making,” *Armed Forces Journal*, vol. 149, no. 3 (October 2011), pp. 26–28.

⁴⁴ Storr, p. 42.

⁴⁵ p. 100.

⁴⁶ *Patterns*, p. 89.

⁴⁷ *Patterns*, p. 97.

⁴⁸ Hammond, p. 147.

⁴⁹ Robert M. Chamberlain, “Lies, Damn Lies, and Counterinsurgency,” *Armed Forces Journal*, May 2008.

⁵⁰ See Clifford Geertz, “Thick Description: Toward an Interpretive Theory of Culture,” pp. 3-30 in C. Geertz, *The Interpretation of Cultures: Selected Essays* (New York: Basic Books, 1973); Geertz himself attributes the concept to the British philosopher Gilbert Ryle.

Avoidance of counterexamples. There certainly are alternative theories of why insurgencies succeed or fail.⁵¹ In the past decade, a host of books have emerged on this subject, temporarily putting paid in this one corner of inquiry to McKeown's assertion that "modern social science does not possess a huge backlog of attractive, highly developed theories that stand in need of testing."⁵² There are probably alternative theories that purport to explain much of what Boyd argues. But at no time does he seem to have rigorously tested the least plausible implications of his theories against empirical reality.⁵³ As yet another famous physicist once put it, "empiricists search most diligently, and with the greatest effort, in exactly those places where it seems most likely that we can prove our theories wrong."⁵⁴ Boyd just didn't bother.

Consider Boyd's emphasis on speed: it is not, contrary to the tenor of his work, always of the essence. It certainly wasn't for Mao, that great insurgent; he preferred going slowly, and did so to great effect.⁵⁵ The *Maguayez* Incident and the entire War of 1812 showed how one can embroil oneself in unneeded fighting by proceeding too quickly. Gradualism clearly worked in Kosovo, whatever the general misgivings at the time.⁵⁶ The American War of Independence was "a patient, incremental, and modulated campaign"; the Anaconda Plan of the American Civil War was a "slow and deliberate squeezing."⁵⁷ The examples go on. Indeed, your enemies may actually *want* you to speed up your decision cycle. Afterwards, you'll grasp at any convenient explanation, regardless of causation; you'll drop your normal buffers against deception; you'll start believing your own lies. OODA is beguiling to inexperienced critical thinkers, but it is based on a deficient but alluring understanding of human cognition.⁵⁸

Problems of originality: an American Way of Imitation

It may be fair to say that many of the successful planners and commanders in the aforementioned campaigns—Mao, Clarke, Washington, Winfield Scott—understood the importance of initiative. Time was, that may have been what we now call "getting inside the decision loop." Initiative is a fuzzy but long-discussed concept; Boyd may have codified it,

⁵¹ See, for example, Anthony James Joes, *Victories Insurgencies: Four Rebellions that Shaped the World* (Lexington: University Press of Kentucky, 2010); Ivan Arreguín-Toft, *How the Weak Win Wars: A Theory of Asymmetric Conflict*, Cambridge Studies in International Relations no. 99 (Cambridge: Cambridge University Press, 2005); David Kilcullen, *Counterinsurgency* (Oxford: Oxford University Press, 2010); or Jeffrey Record, *Beating Goliath: Why Insurgencies Win* (Washington DC: Potomac Books, 2007).

⁵² David Collier, Henry E. Brady, and Jason Seawright, "Critiques, Responses, and Trade-Offs: Drawing Together the Debate," in Henry E. Brady and David Collier, eds., *Rethinking Social Inquiry: Diverse Tools, Shared Standards*, 2nd edition (Lanham: Rowman & Littlefield, 2010), p. 131.

⁵³ The importance of this approach is outlined in Ronald Rogowski, "How Inference in the Social (But Not Physical) Sciences Neglects Theoretical Anomaly," pp. 89-97 in *Rethinking Social Inquiry*.

⁵⁴ Richard Feynman, *The Character of Physical Law* (Cambridge: MIT Press, 1965), p. 158.

⁵⁵ Fadok, p. 18.

⁵⁶ Mets, "Boydmania."

⁵⁷ Thomas Hughes, "The Cult of the Quick," *Aerospace Power Journal*, vol. 15, no. 4 (Winter 2001).

⁵⁸ Insight from Michael R. Rip of Michigan State University.

though that codification clearly needs analytical support. OODA is what everyone remembers,⁵⁹ but even as a cycle, it's not remarkably novel. Boyd's loop was predated in the literature by cycles like Deming and Shewhart's Plan-Do-Check-Act (PDCA), Lawson's Sense-Process-Compose-Decide-Act (SPCDA), and Wohl's Stimulus-Hypothesis-Option-Response (SHOR).⁶⁰

Some of this is resolved by popularity: OODA may be imperfect, but it is widely understood. It is also widely groaned at. Boyd's biographer Robert Coram acknowledges that others had proposed learning cycles before Boyd, but insists that Boyd's unique contribution was showing that the key was “executing the cycle in such a fashion as to get inside the mind and the decision cycle of the adversary.”⁶¹ The aforementioned theoretical and evidentiary deficiencies aside, this may not be historiographically accurate. Boyd himself noted how T.E. Lawrence had written of how a commander must “arrange the mind” of the enemy.⁶² David Mets, that noted critic of Boyd, just sees his work as highly dependent on Russell Weigley's *The American Way of War*.⁶³ Perhaps Boyd's “asymmetric fast transients” are merely a fancy way of invoking Liddell Hart's “indirect method.” If Douhet and Mitchell proposed paralysis through physical destruction, then we might say that Boyd, like John Warden, preached paralysis through interdiction of information. That might seem wholly new, except that Liddell Hart wrote of this as well.⁶⁴

Problems with the medium: those mother-of-all briefings

Early in his intellectual biography of the man, Grant Hammond writes that Boyd's “accomplishments were made with... virtually no publication of his ideas, a rare circumstance for a person deemed so important in certain circles in the last decade of the twentieth century.”⁶⁵ There is indeed a reason for that. As Mets put it, “a theoretician must be a teacher... unless he delivers his ideas in usable form, as in a *book*, then the most brilliant concepts will go for naught.”⁶⁶ As a practical example, consider George F. Kennan's seminal contribution to the concept of containment in the Cold War. Beyond the ‘Long Telegram,’ the famous ‘X’ article of 1947, and some policy papers, Kennan “undertook no systematic exposition of his program.”⁶⁷

⁵⁹ Hammond, p. 188.

⁶⁰ See J.S. Lawson, “Command and Control as a Process,” *IEEE Control Systems Magazine*, March 1981, pp. 5-12; J.G. Wohl, “Force Management Decision Requirements for Air Force Tactical Command and Control,” *IEEE Transactions on Systems, Man, and Cybernetics*, pp. 618-639; R. Brehmer, “Dynamics Decision-Making in Command and Control,” in C. McCann and R. Pigeau, eds., *The Human in Command* (New York: Kluwer, 2000).

⁶¹ Coram, p. 335.

⁶² T. E. Lawrence, *Seven Pillars of Wisdom* (London: Jonathan Cape, 1935), p. 193; quoted in Clive Blount, “Modern Air Power and the 1916 Arab Revolt: What Can the Modern Airman Do to Counter Lawrence of Arabia?” *Air and Space Power Journal*, vol. 23, no. 3 (Fall 2009).

⁶³ Mets, “Boydmania.”

⁶⁴ *Paris, or the Future of War*, p. 212; quoted in Fadok, pp. 40-41.

⁶⁵ Hammond, p. 6.

⁶⁶ Mets, “Boydmania.” The emphasis is mine.

⁶⁷ John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press, 1982), p. 89. For the article, see X, “The Sources of Soviet Conduct,” *Foreign Affairs*, vol. 25, no. 4 (July 1947), pp. 566-582.

Those few writings and the transcripts of some official speeches were for a long time the sum of our record of his thoughts on the question, at least until his memoirs were published in 1967.⁶⁸ Without a fully established and easily digested theory, others could readily take liberties with Kennan's firmly conservative and realist program. In 1950, Paul H. Nitze's alternative plans became the result with the promulgation of National Security Council Report 68, a document of much more expansive ambitions for America's role in the world.

Thus, as anxious as Boyd seemed about misinterpretation of his views, we might wonder why he never, in seven years of constant research, ever produced so much as an article. We are told that he didn't type.⁶⁹ That should not have been fatal, for neither did Clausewitz or Jomini. We are told that as an American military officer, "it was not part of Boyd's culture to write."⁷⁰ This is nonsense: *Parameters*, *Naval War College Review*, and *Airpower Journal* were all publishing his compatriots' ideas, and *Proceedings of the US Naval Institute* had been doing so for about a century. The *Marine Corps Gazette* would have virtually begged him for two pages.

More probably, Boyd suffered from a severe fear of writing,⁷¹ perhaps because he felt that "his thoughts would never be complete, fixed, or perfect."⁷² He didn't write many letters; instead, he talked constantly on the phone.⁷³ He had been a disinterested college student. He did write the *Aerial Attack Study*, but needed some encouragement to do so (and some assistance with the typing). In short, it wasn't the culture that was so verbal; it was Boyd himself. It is a shame that his colleagues never helped him to produce a working paper, just as they did help with his ever-tweaking briefings. But if Mrs. Clausewitz needed to finish *Vom Krieg*, at least Carl left her most of the book. Boyd's work would forever be a work-in-progress.

To be fair, there were advantages to his method. One could say that much of personal experience is "ill-structured,"⁷⁴ particularly that formed in the heat of battle, so well-structured propositional presentation may not be the best approach to teaching about what to do in the next battle. Case study and interactive discussion, as Boyd favored, provide "naturalistic generalization," in which the reader comes to understand the principles conveyed as if they had experienced them through the very cases being related.⁷⁵ Perhaps this is why Boyd always insisted on speaking: his "briefings were essentially a dialogue with the audience."⁷⁶

⁶⁸ George F. Kennan, *Memoirs, 1925–1950* (Boston: Little, Brown, 1967).

⁶⁹ Hammond, p. 179.

⁷⁰ Hammond, p. 17.

⁷¹ Coram, p. 105.

⁷² Hammond, p. 174.

⁷³ Hammond, p. 14.

⁷⁴ R.J. Spiro, W.P. Schmitz, J.G. Samarapungaran, and A.E. Boerger, "Knowledge Acquisition for Application: Cognitive Flexibility and Transfer in Complex Content Domains," pp. 177–199 in B.C. Brittan, ed., *Executive Control Processes* (Hillsdale NJ: Lawrence Erlbaum, 1987), p. 178.

⁷⁵ Robert E. Stake, "Case Studies." See also R.E. Stake and D.J. Trumbull, "Naturalistic Generalizations," *Review Journal of Philosophy and Social Science*, vol. 7, no. 1 (1982), pp. 1–12.

⁷⁶ Hammond, p. 168.

But ultimately, as Hammond insisted to Boyd during one of their interviews, because he “never published his thoughts, poor Mr. Kauffman [still] can't be expected to know them.”⁷⁷ Without explanation, the briefs are virtually impenetrable.⁷⁸ At the sight of them, some are intrigued, but others are just overwhelmed.⁷⁹ As Boyd “left no text for them to analyze... there is almost nothing for academics to expound upon.”⁸⁰ Hammond is critical of the academy for this. But frankly, that is a problem *for* the academics, not *with* them—for without “the discipline of the academic,”⁸¹ how are we to trust in any theory?

Problems of propagation: “self-destructive irrelevancy”

Old PowerPoint slides don't carry well, even if they weren't made with PowerPoint. Boyd himself didn't carry well as a speaker, “unkempt in his appearance, unruly in his behavior,”⁸² with conduct consistently “most unbecoming for an officer and a gentleman.”⁸³ His bullying tendency to change the subject to whatever adjacent concept suited him, whenever it suited him, pretty much precluded collaboration with all but the six people who could somehow tolerate him.⁸⁴ What those six shared was “an almost messianic desire to make a contribution to the world in which they live.”⁸⁵ Messianism, however, isn't a recipe for institutional success.

When they encountered resistance, they blamed the audience. Boyd “expected those who disagreed with him to come around to his viewpoint—and quickly. If someone belittled his ideas, they (*sic*) were instantly and forever dismissed from his life. They ceased to exist. He never spoke to them again.”⁸⁶ One of his followers, James Burton, in the prologue to his book about his own bureaucratic battles in the Pentagon, wrote that he believed that this opposition generally stemmed from “moral and ethical corruption, incompetence, and blind ambition.”⁸⁷ Boyd himself became “personally and professionally disgusted with both” Charles Bennett (Democrat-Florida) and Tom Ridge (Republican-Pennsylvania), co-chairmen of the Congressional Military Reform Caucus, and military veterans both.⁸⁸ Storming off from one's sponsors usually isn't a winning move. Boyd's views of the democratic process were unhelpful,

⁷⁷ Hammond, p. 184; relating a telephone conversation from 1995.

⁷⁸ Coram, p. 329.

⁷⁹ Hammond, p. 187.

⁸⁰ Coram, pp. 7, 445.

⁸¹ Coram, p. 339.

⁸² Hammond, p. 6.

⁸³ Coram, p. 54.

⁸⁴ Hammond, pp. 183–186.

⁸⁵ Coram, p. 139.

⁸⁶ Coram, p. 55.

⁸⁷ James G. Burton, *The Pentagon Wars: Reformers Challenge the Old Guard* (Annapolis: Naval Institute Press, 1993), p. 5.

⁸⁸ Hammond, p. 178.

and even naïve. He offered no alternative beyond exhortations to “do the right thing.”⁸⁹ Eventually, he found himself close to a nervous breakdown “as a result of his own inability to orchestrate the proper behavior.”⁹⁰ That's just not surprising. The US federal system is probably designed to frustrate the ability of any one man to do what he thinks is the right thing—particularly when not everyone agrees that is the right thing.⁹¹

Interpersonal skills do matter in the propagation of scientific ideas. Consider the experience of Ignac Semmelweis, the nineteenth-century Austrian obstetrician who discovered that the transmission of infectious diseases could be stopped with chlorine disinfection. “Semmelweis’s work was accepted by few of his contemporaries,” and at the cost of many lives, “due in part to his troubled and disputatious personality.”⁹² If this is blaming the messenger, so be it. Empirically, the style of the message matters.

But all the same, early on, Boyd was “showing [noted military analyst and critic Franklin Charles] Spinney how to work within the bureaucracy to affect change in the Pentagon.”⁹³ It’s worth considering what happened. As one of Spinney’s former colleagues at the Pentagon’s Program Analysis and Evaluation office put it, “the point at which Chuck went off the reservation” was when he started to presume that those opposed to him were evil.⁹⁴ Evil is not a good simplifying assumption. As Nobel laureate Elinor Ostrom wrote about her path-breaking work on cooperative common property management, “instead of presuming that some individuals are incompetent, evil, or irrational, and others omniscient, I presume that individuals have very similar limited capabilities to reason and figure out the structure of complex environments.”⁹⁵ In the long run, that openness will produce far better results, whether for a researcher or an advocate.

The grumpiness was continued after his death by Boyd’s associates. Boyd has been put forward by supporters as the architect of the 1991 victory against Iraq. Such an assertion, though, is to ignore the obvious counterfactual. The Iraqis were so shaky that the Marines and the Army would have won in a frontal assault without any preparatory bombardment, just by their tactical superiority.⁹⁶ And questioning whether the 2003 campaign could be called successful, simply on the criterion of whether it adhered or not to Boyd’s theories, is indeed the tail wagging the strategic dog.⁹⁷ The point here is simply that while mavericks can play “a pivotal role” in the

⁸⁹ Hammond, p. 175; for a managerial view on the senselessness of this approach, see W. Edwards Deming, *Out of the Crisis* (Cambridge: MIT Press, 2000).

⁹⁰ Hammond, p. 178.

⁹¹ See David Robertson and Dennis Judd, *The Development of American Public Policy: The Structure of Policy Restraint* (Scott, Foresman, 1989), for a whole book on this concept.

⁹² David A. Fulghum, “On Types of Scientific Inquiry: The Role of Qualitative Reasoning,” in *Rethinking Social Inquiry*, pp. 224–25.

⁹³ Coram, p. 363.

⁹⁴ Personal communication, September 2011.

⁹⁵ Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge Series on the Political Economy of Institutions and Decisions, Paul Sabatier, ed. (Cambridge University Press, 1990), p. 25.

⁹⁶ Mets, “Boydmania.”

⁹⁷ See William Lind, “Don't Take John Boyd's Name in Vain,” *Counterpunch*, 1 May 2003.

military innovation process, those innovators themselves “must walk a fine line between constructive criticism and self-destructive irrelevancy” if they are to actually effect change.⁹⁸ The carryings-on of some of his adherents today aren’t actually helping make the case.

Beyond the Problems: A Research Agenda

In any event, theirs is a considerable task. Cranky or conventional, we should be wary of all who peddle the keys to victory. Returning to the initial comparison, though, if given the choice, I will take Boyd over Warden. Boyd's didactic intent was Clausewitzian, with goals of *orthodoxy*—the propagation of his view of the correct beliefs about how to *think* about war. Rather as Steve Jobs once implored, Boyd wanted us to think, but to think different. What we did with that thinking was up to us. Warden's intent was Jominian, with a goal of *orthopraxy*—adherence to his traditional view of the correct way to *act* in (aerial) war. Warden specified one particular approach to warfare, whatever the political possibilities.⁹⁹

But like all military strategies, Boyd's still remains shaped by technology and circumstance. If, say, command and control become more decentralized through better information technology, then targeting C2 may yield less impressive results. Boyd's is thus not a Theory of Everything. Perhaps he did not intend it that way. If so, we should stop claiming it as such. It's possible that Boyd sometimes had the right answers for the wrong reasons—but that's still a problem, as are the sundry problems outlined above. Both Boyd's supporters and skeptics should, unless their opinions are ossified, be interested in addressing these difficulties so that his ideas might be better supported and propagated—or so that they might be rejected where appropriate.

I thus propose a research program. Given the breadth of Boyd's knowledge and thinking, this will be a tall order itself. But the social sciences are not exact sciences, and strategy less than most, so good strategic thought should benefit from methodological triangulation.¹⁰⁰ The problems of originality and in the initial propagation will probably remain, but the other four areas can definitely be addressed, and developing a better medium will itself eventually propagate the message better:

Epistemology. Writing this study has been like a fighter pilot's tail-chase of Boyd the intellectual: turning, accelerating, decelerating, and turning again through the breadth and depth of a host of academic disciplines. But evidence invoked from across realms of knowledge should be true to commonly accepted interpretations. Boyd's collective invocation of Heisenberg, Gödel, and Clausius needs to stand on firmer philosophical ground than that supported by hand-waving. Either the argument should be validated, or his supporters should seek an alternative connection of greater robustness.

Theory. Some work (see note 41 above) has already been undertaken to formalize and test the OODA Loop against actual conditions. Some of that work, in control theory, has already indicated that the loop, at least as Boyd imagined it, has significant shortcomings. Boyd's loop has been so widely popularized that many who don't know his name know his product. But that

⁹⁸ Brett Steele, *Military Reengineering Between the World Wars*, MG-253 (Santa Monica: RAND, 2005), p. x.

⁹⁹ Fadok, p. v.

¹⁰⁰ Sidney Tarrow, “Bridging the Quantitative-Qualitative Divide,” in *Rethinking Social Inquiry*, pp. 108–110.

doesn't mean that better concepts can't be devised, and indeed they should, if they offer better descriptive and explanatory power.

Evidence. The details of Boyd's interpretations of other strategists' views aside, most of Boyd's assertions about his fuzzily-bounded dataset remain untested. Starting with one of the more challenging questions for his theories, we should want to know whether "fast asymmetric transients" actually deliver advantage in guerrilla warfare. Given the large efforts currently being expended in thinking about counterinsurgency, this should warrant some attention.

Medium. Coram and Warden's individual biographies are definitely worth any scholar's time as a means to understanding how Boyd's thinking developed. Osinga's work is today the essential guide to what Boyd's thinking *was*. But three volumes, including Osinga's 257 pages of rather dense writing, are a stretch as bedtime reading for most dusty-boots officers in the Middle East (though notably excepting James Mattis himself). Needed is a sort of medium-weight work, an exposition of Boyd's ideas that turns his sketchy slides into prose, following his thought patterns, but offering criticisms and potential applications as commentaries along the way.

Who might undertake this effort? It's remarkable that four of the five US military services each use Boyd's ideas in their doctrines (whatever their actual practice), and each maintain post-graduate teaching and research institutions. Assuredly some eager master's students are looking for thesis topics. If this program is successful, Boyd's ideas will gain greater currency. If it is not, we will have some indication that they should not. But no one should fear this program. As one scholar of Genghis John put it, "Clausewitz still gets the microscope"; Boyd should too.¹⁰¹

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¹⁰¹ Personal communication, David Foster of Naval Air Systems Command, 10 October 2011.