



# The Risk Calculus

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## A Game of Hits and Misses

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Host: Andrew Reddie

Guest: John Emery

Series: Shall We Play A Game?

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John Emery

Wargaming is fundamentally about human behavior. It's an exercise in human interaction and the interplay of human decision.

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Andrew Reddie

Welcome back to the Risk Calculus and our wargaming series Shall We Play a Game?

Today we delve into wargaming's long history, noting its varied applications for education, training and analysis.

So we ask the following questions: When is wargaming more or less popular? What is the difference between gaming a hot versus a cold war? What are some of the most significant war games in history? And what can we learn from past attempts to imagine the future of war?

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Andrew Reddie

To help us unpack some of these issues, we're delighted to welcome Dr. John Emery, a professor of International Security at the University of Oklahoma and one of the world's leading experts on the historical applications of wargaming.

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So John, from your perspective, where did wargaming begin?

John Emery

Thanks so much for having me.

You know, it's difficult to say, depending on how you define a wargame. I think if we go back about 2500 years in China, you could say the game of go is a strategy game that could be associated with war.

I think we often associate kind of early strategy games as well with chess, which is based on an older Indian game of Chaturanga from the sixth century BC.

But what we tend to think of with contemporary war gaming really has its roots in the 19th century in Prussia, or Germany for those that don't know their history too well.

Andrew Reddie

And would you say that the Germans, when they're starting to use wargaming tools, is it primarily for educational purposes or they actually starting to use them for analysis?

John Emery

I feel like they're really starting to use it for analysis, at least initially. So the kind of war gaming in Prussia really emerged out of this kind of enlightenment era belief that any human endeavor, including the chaos of the battlefield and war could be analyzed through a scientific method.

So in some sense, it was a way to analyze warfare in order to make it more scientific, more predictable and ultimately, hopefully, winnable. But on the other hand, it was also good use of training for times of war.

The Prussian General Staff officer Karl Von Müffling when they were talking about early battlefield tactics and use of war gaming says "it's not a game, it's training for war. I shall recommend it to the whole army."



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So he got every regiment to play this small kind of tabletop tactic war game, which led to a rise in popularity in wargaming clubs across Prussia at the time.

So you can see both the kind of scientific endeavor in order to make war more predictable, but also the kind of use in training and thinking through for an officer class.

Andrew Reddie

And was that actually successful in terms of how the Prussian military actually managed to perform on the battlefield?

John Emery

So I think everyone at the time felt that it was quite successful and I think that's the interesting thing. It had little influence, you know, wargaming, outside of the world until 1870 when the Prussians defeated the French in the Franco Prussian war. And many credit its victory to its kind of bold wargaming tradition.

But I think you also have to view this wargaming in context of the industrial revolution at the time. You know, in the 1870s, the railroad revolution was just starting to take place in Germany.

And so the officer class was very much in a period of transition in the Prussian general staff because it was a lot less about, you know, kind of being the ideal warrior. But instead you became a technician, a bureaucrat and engineer.

You had to think through how the train timetables would impact your war instead of marching your troops somewhere you would want them to meet at the perfect moment at the perfect time.

So the kind of new technological revolution in trains and railroads kind of forced the Prussians to think differently about war. And in a certain way, you could plan war more perfectly. In order to do that, you had to be more of a technician than that of a kind of war practitioner.



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So I think the combination of war gaming and thinking through these kinds of dilemmas in the period of a technological revolution had a huge impact on Prussian victories.

Andrew Reddie

I really like that point around how complexity kind of drove the need for having wargaming methods at the back end for military decision making, I think that's something that will come up a lot in this series.

Does the perceived success of war gaming methods kind of explain how it spread to the rest of the world from Prussia.

John Emery

Yeah, I think that was kind of a big ah-ha moment because only 16 years later, in 1886, wargaming really came to America.

So Captain Alfred Mahan became president of the Naval War College and he encouraged the use of war games by the navy based on the Prussian model of Kriegsspiel, or this type of tabletop small miniature tactic games. And so he invented essentially a naval version of moving cardboard ships across paper simulating hypothetical battles between great powers.

So you can see it very much influenced by the Prussian model when it came to America a short time later.

Andrew Reddie

And in that American use case, I mean, again, is it kind of doing that dual education and training application alongside the analytical one or is it more on the education and training side given that it is happening inside the Naval War College?

John Emery

I think again, it always has kind of the double edge, right?

Andrew Reddie

Yeah.



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John Emery

It allows you to kind of think through scenarios and possible reactions to an uncertain enemy move. Right, so wargaming is fundamentally about human behavior. It's an exercise in human interaction and the interplay of human decisions.

So we may have certain assumptions about how an enemy navy may act, but you're always operating under conditions of uncertainty.

So this kind of gives you a bit of like muscle memory almost and works your mind in powerful ways if you are, you know, training in the US Navy at the time, to kind of think through possible scenarios, how you would respond. And it kind of gives you the practice almost of fighting war but also is very very useful in kind of analyzing past battles in addition to thinking about the future.

Andrew Reddie

And I think the follow up question there was, you know, how did the Naval War College applications of wargaming actually perform in terms of preparing both officers for leading in World War One and World War Two and then also actually coming up with the battle plans for those conflicts?

John Emery

Yeah so part of the most famous part of naval wargaming in US history really comes from the interwar period. So between World War One and World War Two at the Naval War College.

So the commander in chief of the Pacific Fleet, Admiral Nimitz basically stated after World War two that nothing surprised him in World War Two when they encountered the Japanese Navy, because they had practiced an immense variety of gaming the naval fleets prior to the engagement. The only thing that surprised him were kamikaze attacks.

So there's this sense that in essence, it's practice for warfare. But even if you don't assume everything about how your enemy will act, it gives you that kind of malleability in order to react. So you have certain assumptions about what the Japanese navy may do and may fight, but at least for Nimitz, he said that this was integral for U.S. naval victory in World War Two.



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Andrew Reddie

Just another part of them, the early history of wargaming - obviously, we've talked primarily about military applications, but there was also the non-military side of war gaming as well where you had kind of hobbyists taking wargaming methods and using them in places like universities and what have you.

I'm just wondering from your perspective, what that kind of non-military application of wargaming looked like in that period given that it becomes so important later on.

John Emery

So I think I would go to the English futurist H.G. Wells. We most know him for his work, the Time Machine or War of the Worlds but actually he wrote a book in 1913 called Little Wars and it was the first kind of rule book for land based miniature wargaming.

And so you see this kind of hobbyist presence that really kind of drives military wargaming in a lot of ways. And it's kind of interesting to see the two parallel tracks go along with each other - that someone you think of as this kind of sci-fi futurist who predicted the internet of all things in the 1920s actually wrote a book on miniature wargaming and wrote some rules for it.

So you see this kind of notion that, you know, when you're thinking about the future, this is a very useful tool to think through possible future scenarios.

Andrew Reddie

That's great.

Yeah, and it becomes so important because obviously that hobbyist wargaming community still exists today and it becomes really important to think about how these wargaming methods can be applied in non-military contexts when we start thinking about how think tanks started to use these tools during the Cold War.

[MUSIC PLAYING]

Andrew Reddie



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So John, obviously, I think certainly for an American audience, we'll all be fairly familiar with how wargames have been used since the 1950s and onwards, but why were wargaming methods such a big deal during the Cold War?

John Emery

So you have a radical transformation with the birth of the atomic age in interstate relations and the nature of warfare. There was a real recognition after Hiroshima and Nagasaki, especially that war had fundamentally changed in the international system.

So it was no longer delaying the period between major wars, they had to be avoided at all costs. And there was a real kind of intellectual competition at the time for how best to do that.

There was actually a big movement by the scientists and engineers of the Manhattan project calling for world government control over nuclear weapons because they saw the dangers that they kind of inherently posed, they viewed their use as inevitable.

But there was a more prominent strand that started to gain traction, looking at this thing that we now know today as deterrence theory. Right, so the ability to hold your enemy at such risk that they would be deterred from ever attacking you.

And so you have this period of immense uncertainty for what wars will look like. You have zero empirical data because thankfully an atomic exchange never took place. And you have this kind of untested theory that you're basing kind of the survival of humanity on.

So gaming was one method by which you went about thinking through the possible scenarios in which the US and the Soviet Union might engage in a nuclear conflict and the kind of consequences that could arise from that.

Andrew Reddie

So when you think back to some of those Naval War College examples that we were talking about earlier, what made the games that were being played at the likes of RAND during the Cold War different from those that were being played in Naval War College during the interwar years.



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John Emery

So the RAND corporation is really interesting. You can really think of the RAND corporation as essentially a modern day think tank, but it was tasked solely as a think tank for the US Air Force in the early 1950s.

So really focused on these difficult problems of rapidly advancing technology, changing nature of warfare. But specifically the real innovation that came from the RAND Corporation was the idea of political military gaming.

So before you would think a lot like at the Naval War College about naval tactics or land based tactics in some of the early Prussian games. But here you're thinking about the influence of politics. So how do politics, psychology, culture play into this kind of delicate balance of terror of the US and Soviet Union holding each other at bay in this dangerous stance of a nuclear deterrence.

So you're really starting for the first time to integrate economics, you know, because nuclear weapons are a huge economic endeavor to undertake as well as the psychology of individual leaders. You have to take all of this into account. It's no longer kind of a science of warfare that can be predicted in the same way, but it's looking at the whims of individual leaders.

Right, so integrating politics and economics into traditional wargaming was what I view as one of RAND's singular, incredible contributions to the history of wargaming.

Andrew Reddie

Yeah, I really like that kind of separation as well that you're making between the kind of tactical level decision making and then the strategic level decision making and how those really are two different types of problem sets for policymakers to kind of grapple with.

So what do we get out of these games that the likes of Rand are playing in the 1950s and 1960s?

John Emery





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So you get quite a few different things and so it really depends on which types of games you are playing. The ones that I really tried to focus on in my initial archival research at the RAND Corporation was something known as the Cold War game.

So it was really the first attempt to integrate politics and economics into traditional war games to see how the nuclear option changes decision making in so many ways.

And so you see a few different varieties you have on the one hand, the mathematicians at RAND that are trying to predict what a nuclear war might look like. So they think with the new methods of, you know, game theoretic applications and early computing power that you might be able to analyze and predict based on a series of war games, what would happen in an actual war.

On the other hand, you have social scientists at the RAND Corporation, that were thinking much more about the right questions to ask rather than a search for answers. So they engaged in a hyper realistic game of Cold War scenarios where you think through: Ok. Well, if Russia does this, how might the US respond? What are our options beyond, kind of, war? What are economic options, political options, et cetera?

And really, it was more of a tool for the social scientists there to think through, you know, asking the right questions to kind of lead toward policy implications and getting the feeling of war rather than so much the answers to what might happen.

So you see a big rise in war gaming coming out of RAND, but especially at the strategic nuclear level.

Andrew Reddie

And these games, I mean, obviously it has the kind of same challenge that all intelligence analysis has where, you know, usually analysts are giving probabilistic estimates and then ultimately a decision maker has to make a deterministic decision.

But are there examples of games from your work that you see actually precipitate a policy shift?



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John Emery

Yeah, I think these RAND games really did precipitate quite a policy shift.

So in the social science division games, it ran, they brought in some players from the State Department as well to kind of think through, you know, what happens in the early Cold War period where, you know, you have France kind of constantly changing governments over and over and you know, they may be a little bit more delicate about the NATO alliance because they have probably a safe assumption that the United States wouldn't trade New York for Paris, if it came to a nuclear conflict with the Soviets. And so how do you take into account kind of all those alliances and balances?

So the State Department found this incredibly helpful and they absolutely fell in love with the style of games because it was a hugely immersive activity. You were emotionally exhausted after partaking in it. But it also gave you this kind of muscle memory to think through possible scenarios and kind of getting you into a flow of working under conditions of uncertainty.

So the State Department went on and adopted this type of political military gaming model and it proliferated into other war colleges and into places like MIT as well where it was picked up by Tom Schelling and Lincoln Bloomfield.

Andrew Reddie

Perfect. And obviously, you know, certainly the two of us have a lot to say about wargaming methods and we are probably accused of looking at wargaming methods through rose tinted glasses. But are there games during this period that got things wrong?

John Emery

Plenty.

So that's the thing about wargames is that depending on what you're trying to do with it, will lead to outcomes, right? Like everything else, whatever you assume going into it can drive outcomes.



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So one of my favorite examples of a war game gone awry was in 1962 following the Cuban Missile Crisis. The US undertook a massive computerized war game which ultimate conclusions, to give you the bottom line up front, were the United States would prevail in a total nuclear war, full stop.

Right. Absolutely insane. This game was called the Simulation of Total Atomic Global Exchange. It took three years of preparation, five months to play where programmers were putting in punch cards with instructions onto this early computer, with electronic symbols representing missiles, bombers, decoys, interceptions, et cetera.

So they feed over 160,000 instructions into this computer and determine which strikes were successful, how many losses were suffered, et cetera. And the ultimate conclusion of this is that in an all out total atomic global exchange, the U.S. would prevail over the Soviet Union.

Of course, history bears out that later on, we know that we all would have died because we weren't taking into account fire and smoke and all the other things that would lead to nuclear winter that they didn't know about at the time. So this kind of advanced technical planning ultimately leads to false conclusions that somehow we could win an all out nuclear war.

### Andrew Reddie

I mean, I think it is obviously behooves us to think about what the limits are of any particular method of analysis and reflecting on those historical lessons is really important.

Before we close, I am interested, in kind of, you know, as one of the world's leading historians about the use of wargaming methods. What are the lessons that you've seen from the past that you want to make sure that we remember for wargaming methods being used today, particularly as we have policymakers who are increasingly keen to see wargaming methods used to color our policy prescriptions for the challenges that we face sitting here in 2023?

### John Emery

So I think there are three key lessons that I learned in my kind of exploration of historical war games that I want especially policymakers to take away.



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The first one is to take seriously uncertainty. Use war games to search for the right questions and to think through, rather than to search for answers. Right, we see a lot of headlines today that are very attention grabbing saying, you know, wargaming, especially something like a Chinese crisis in Taiwan, et cetera, leading to kind of conclusions that may have been true for the game but may not be true when you take into account all of the uncertainty that human agency kind of allows for.

And I think the second lesson is study history. You know, I think the real benefit of historical wargames is that we can look back and see what their fundamental assumptions were in designing these games. Right, what did they think the future of war might look like? How was that right and how was that wrong? And how can learning from those kinds of assumptions and historical record, you know, inform us about future conflicts?

Because I think we have a tendency to read history backwards a lot. We tend to view this kind of inevitability when really it's always a constant push and pull of thinking about what are the possible futures of war, how do we invest in that today, and what are our kind of fundamental assumptions that we get wrong.

And I think the third one that's most important and one of my main takeaways from historical war games is that emotion, psychology, and I would even say ethics are integral into decision making and we can't assume those things out.

Right, humans are not computers, we're not mechanical processes, even though a lot of the early random mathematicians viewed the human mind as if it were a black box. We're not, we get angry, we get frustrated, we make rash decisions a lot of times.

So taking in the human element and playing games with high degrees of realism, I think are very beneficial for us to think, you know, to kind of bear the burden of decision making, make it not so abstract, but make it something that really makes us feel like we are involved making the decision and that human lives are at stake because we make very different decisions when you have the kind of weight of human life on your back than if you're writing a paper on it.



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And I think wargaming is one way to think and practice that.

Andrew Reddie

That's great, yeah, I really like that last point. I mean, in reality and from my perspective, that is the secret sauce of wargaming as a data generating process, the fact that you have a human integrally inside of the loop as decisions are being made. The human component and the human element is so important, particularly when you compare it to things like simulation and modeling tools.

Thanks so much for joining us, John. As those that are interested want to kind of delve more deeply into this topic area, what would you recommend that they go and look at?

John Emery

I think the most influential book on the history of wargaming for me, it's edited by John Curry, but it's Andrew Wilson's *The Bomb and the Computer: The History of Professional Wargaming 1780- 1968*. So this book is a little bit difficult to find but is incredibly useful.

Also for those interested in the art of wargaming, Peter Perla has a book by that title and there's a lot of amazing work being done by people like Becca Wasser and Stacy Pettyjohn at CNAS today as well too.

So I think those are good places to start to think about both historical and contemporary war gaming.

Andrew Reddie

Perfect. So John, thank you so much for joining us, I really appreciate you taking the time.

We'll include links to your suggestions in our show notes and we'll also post a list on the BRSL website.

In the next episode I'll be talking to Doctor Reid Pauly who has spent a lot of time in the archives trying to reconstruct some of those Cold War games we mentioned today. We'll be



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discussing what went into those games and how they shape the way that we think about strategy today. I hope you'll join us for that.

Thank you to John, the recording studio hosts, Andre Anderson and Citrus, our podcast producer, Jane Dry Menton and all of you for tuning in.

Until next time, I'm Andrew Reddie and you've been listening to the Risk Calculus.

[MUSIC PLAYING]

John Emery

So I think one of my favorite examples of a war game, this is a bit less tabletop exercise, a bit more military planning, was Operation Millennium Challenge in 2002. Have you ever heard of this one, Andrew?

Andrew Reddie

Hm.

John Emery

Yeah so this was one of the most expensive kind of war planning exercises that the US Navy had done at this time. Orders of hundreds of millions of dollars to basically plan a crisis scenario in the Persian Gulf and how the US would respond by showing off its network centric warfare, right, the best new technologies for the Navy.

And they had one US General Van Ripper red-teaming, so essentially he was acting like the enemy. And what he decided to do was to pre-empt the preemptions and since his enemy was high tech, he would go low tech. And so a war game that was supposed to last weeks on end, he ended up sinking the entire US fleet in a matter of 15 minutes by small fishing vessels using suicide methods.

And they basically told Van Ripper, No, no, no, you can't do that, refloat the US fleet. And he's like, look, you expect the enemy to act a certain way, that's a really dangerous thing to do. Your



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high tech network centric warfare is also one of your greatest weaknesses because you're relying on it a bit too much.

And so there were a lot of kind of lessons learned from that 2002 massive, massive naval exercise and war game, that I think is hyper relevant still today.

Andrew Reddie

That's really interesting, it's reminiscent of a Japanese example in the run up to World War Two as well where they had a very similar phenomenon where they had young officers that got told that they couldn't do particular things with their vessels because the Americans would never have done that. And so the same type of scenario that you're describing there.

That was too good for bonus material, John, we're gonna have to bring that up into the real thing. That was great.

John Emery

Sounds good.

