Neuroweapons Are a Reality: Cognitive Warfare and the OODA Loop | James Giordano, PhD

Cold open: the brain as a system of orientation

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Really what is a nervous system? What is a brain? Yeah. I mean you have to consider the brain and a nervous system
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to be a system of orientation and a system of relationality. It relates the
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interiority of the organism to the exteriority of the organism. What am I getting at? The underlying message is
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very simple. Then there is no layout.
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Unless we can eliminate the feature just cited. Well Bob know [music] we don't know how to do this.
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There is no way out. Hey, welcome back to No Way Out. I'm Brian Poncha. Three years ago, Dr. James

Dr. James Giordano returns to No Way Out

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Jardano sat down with us and told us the brain is a battle space of the 21st century. Doc G is back. Dr. Jardano is
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professor emmeritus of neurology, biochemistry, and ethics at Georgetown University Medical Center. He currently
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serves as special adviser to the office of the assistant secretary of war for chemical, biological, radiological, and
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nuclear. He is also head of the center for strategic deterrence and weapons of
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mass destruction studies at the institute for national strategic studies, national defense university in
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Washington DC. Now you know why we use acronyms in the military. There he
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advises the department of war, the joint staff on biotechnology, neurokcognitive warfare, artificial intelligence,
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unmanned automated systems, quantum technology, and national biocurity.
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And in his own words, he is a huge John Boyd fan. One note before we get
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started, about 40 minutes into our conversation, his connection dropped. He came back from his desk at National
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Defense University where cameras are not necessarily allowed. Uh, so the rest of the conversation is his voice only. In
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his words, by the way, he's been told he has a great face for radio. Dr. G opens
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up with a note about his role. So, I'll hand it straight to him and we'll get airborne. Yeah. So, in my current role,
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I I do an awful lot of work with the Department of War. And so, of course, everything that I've talked to you about here today represents my own views and
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opinions and doesn't necessarily reflect those of the United States government, the Department of War, or the National
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Defense University. Three years ago, you were on here with us and you shared with our audience that the brain is a battle space of of the

Brain science speed gap: 40 months vs 60 months

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21st century. What has moved from possible to operational since then? What has changed in the last 3 years? You
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know, quite a bit. I mean, I think the the the main issue here is that our primary peer competitor, our trans-Pacific pure competitor is
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advancing brain science and brain technology at a very rapid rate. I mean their their conversion from what would
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be conceptual into what may actually be a workable construct an operationalizable construct is about 40
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calendar months. Now if you compare that to what we're doing here in the states probably the most advanced research
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initiatives are those that are being put forth by DARPA the Defense Advanced Research Project Agency and those tend
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to work within about a 60 calendar month time frame. So although at at first blush it would seem well you know 40
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calendar months or 60 calendar months that's not such a big delta it actually is because what that allows is two basic
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things. First it allows things to go from the research bench operationally into what is going to be the new
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battlescape. When that battlescape is kinetic or non-kinetic again it just depends on what we're talking about. That's number one. And number two, it
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allows that phase of testing operationalizable to be is it scalable, fieldable, useful, and if not,
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adaptations can then occur. So by the time we're ready to sort of engage, we're already several at least months,
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if not years behind what would be a viable paradigm or set of protocols for that level of operational engagement. So

Dual-use biotech and AI vs AI in biosecurity

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that's the first point. The second point is that there are a lot of things that are happening in mainstream bioscience
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and biotechnology that are characteristically oriented towards what I'll call the lowhanging fruit of the
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benevolence of medicine. The idea of making people's lives better, more
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survivable, making lives more capable in terms of flourishing, reducing the predicament of illness and injury, etc.
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And the whole feel, the whole pallet of tools that are viable, for example, in
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personalized medicine, precision personalized medicine are essentially double-edged blades. These are all
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duallyy usable to create precision pathogens. So, you know, more recently, one of the things we've heard is the use
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of artificial intelligence in in three primary ways. number one to be able to
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be used to develop new drugs, various new peptides, new combinations of
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existing not only drugs, peptides, and biologics, but to develop new devices
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that may be capable of tremendous biomedical import utility and value. But then you can flip that. Once again,
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we've heard that artificial intelligence can be used to generate novel forms of peptide folding, perhaps develop new
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ways of engaging gene editing and synthetic biology to make certain types
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of microbes such as bacteria, viruses, even fungi a new or modify existing
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entities. So they now make them far more pathogenic, far more specific, far more transmissible and very very
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personalizable. In other words, matching the pathogen to a particular genotype or phenotype. And the third is that of
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course last year at the United States general at the UN General Council, the United Nations General Council,
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president of the United States announced that we'll be using artificial intelligence to monitor and surveil
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other count's compliance and adherence with the biological toxins and weapons convention. Perfectly valid and I think
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of great value. However, we also have to be aware that what's ending up happening is that other nations, primarily our
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international peer competitors here, most notably China and Russia, will also
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now begin to employ their AI in those ways that can now deceive our AI. So now
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you're getting an AI versus AI in the bioscience and biotechnological millu.
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And as a consequence, you're seeing an entirely new front, operational front of engagement
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and in some cases of competition and conflict. So those three aspects taken
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together again not in any ways that are mutually exclusive but that are taken in in in unity I think create a very very
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different perspective of not only what is capable in terms of bioscience and
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technology but what is very viable what is valuable and of course at this point
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what is actually operationalizable so you brought up something here about the 6040 months uh the environment and what

The dOODAc loop: dispositions, consequences, and Boyd

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I'm tracking here is the environment is changing faster than the way we could respond to it. So we've had a lot of folks come on and talk about perception
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action loops, ecological psychology, the free energy pr principle, active inference, predictive processing. So
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understanding how we process, how we perceive reality, how we decide, how we act, how we learn, how we adapt is
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absolutely central to this battlescape. I think that's what you called it, right? Is that correct? Okay. So, can
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you walk us through a little bit about you brought this up the last time around on the show about the I think I'm get
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the name right, DODAc. So, it's uh disposition with the Udaloop and consequences.
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You rewrote that or you worked that into a recent article I have it so I can bring it up here in a moment, but can
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you walk us through why you're going back to that and and starting with this position and how that relates to
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everything you just brought up? Yeah, I mean I I think it's it's fundamentally important to reinstitute and reiterate
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the the value of Boyd's udaloop. I mean it stood the test of time and of course
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coming from where it came from. I mean, you know, John Boyd being a very intelligent guy and not just limited to
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sort of what's happening operationally, but understanding cognitive processes and how they work create a very simplified model of the
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way human brains and perhaps other brains that are engaged in these types of cognitive processes really engage the
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the overall mechanistic approach to what may be decision-m pursuant to action or inaction. So the idea of observing
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something, orienting to it, relating that orientation to what may be prior memories and expectations, making
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a decision based upon weighing out those variable options very very quickly and then acting well that that is preserved
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the test of time. the simple udaloop very very valuable into unto itself but of course in even in Boyd's writing the
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idea that the udaloop does not exist as a standalone entity but exists far larger within a larger cognitive
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construct that really looks at any brain any nervous system as a time machine and
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I think that that's a really good way to put it the way brains work the way nervous systems work even simple nervous

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systems is they relate what's happening in the present to things that may have been learned from the past and the way
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neural systems encode at least in part is what's referred to as basian encoding. In other words, they're you're
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getting reinforcement for things that are similar and an absence of reinforcement or disinforcement for
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things that are not necessarily similar. So what we tend to do is we tend to gig on. We tend to orient towards those
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things that are familiar to us based upon our similarity with known entities, known events, known outcomes. And then
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what we do is we make our decisions and orientations about what's in our present state as a consequence of those
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pre-existing conditionalities and contingencies. In other words, dispositions. So dispositions feed into
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even the way we observe the world. And in fact, that existing D or B,
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whether it's dispositions or whether it's true biases flavor the things we look at it and how we look at various
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things. I mean it happens to all of us. What will I pay attention to? What is sentininal to me? What do I recognize
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based upon my prior experiences is going to be of value of me to even orient my
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vision to in observation before I orient my cognitive processes to make some sense of what it is that I'm looking at.
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Then I have to make some sense of it. So I then look at what this thing is, make some sense of it based upon my knowledge
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of the thing. Again based primarily on my prior inferences, intellect,
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intuitions. From that point, I begin my decisional process. What can be done in
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response to this? And based upon those prior dispositions and how those dispositions have then fed forward to
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guide prior actions, what should I do and then I do it. But then ultimately
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what I'm also doing is I'm waiting for the consequences of those actions to do one of two things. either reinforce my
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extent dispositions through some level of consonance or to invalidate those

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prior dispositions through a process of dissonance and based upon that I'm either going to
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retain my pre-existing dispositions and biases and have them fortified or those
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are going to be threatened and once those things become threatened a number of processes can occur in other words now I can get true what's called
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cognitive dissonance and that can cause me stress and that can cause me particular vulnerabilities and volatility ilities and the way I think
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and act or what I'm doing is I'm taking that information and I'm utilizing that information to now incorporate that into
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a larger knowledge set and I'm now developing some sense of practical wisdom. In other words, what I thought may have been true before or what I
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thought may have been pretending what may be outcomes based upon a decision. That's not necessarily so. So, I now
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need to change my thinking schemata in accordance to this. Revise that thinking schemata. revise what it is I'm I'm
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observing, how I'm orienting to it, and what my decisions are. So, I can now generate a new action schema. So, that
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doodac looping is, I think, an embellished aspect of Boyd's initial
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udaloop that comes out of Boyd's writings themselves. And what my colleague Diane Dus and I have done is really just sort of played that out a
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little more fully, embellished it to some extent in terms of what we know about neurokcognitive processes and then
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fit that within the framework of how this would work operationally. So I'm curious here are you separating, we'll

Dispositions shape what you observe

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use disposition separate from orientation and the way we look at orientation is it's it's a generative
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model. It's built on our genetics, our culture and our experiences. Um, what I'm hearing from you and I want to make
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sure our listeners and I understand this completely is is are you separating that now? Are you saying that that's outside
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of orientation or that's still part of orientation and you're just amplifying to to our leaders that hey this is

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critical in understanding an agent performer environment relationship how how we're coupled to the environment.
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Can can you expand on that? Sure. Well well very often what you find is that orientation also depends upon
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what the observations are, right? So orientation following observation basically implies that I'm
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orienting to something that I've observed good enough. But the issue then
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becomes what am I observing in the first place? How is it that I'm generating these observations? What am I choosing
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to look at? And that's where those predispositions andor biases, cognitive biases come into play. And I I think
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even the problem with using the word biases is that it tends to have a negative connotation. In this case, not
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at all. Those biases are simply that. They are predispositions that may flavor
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or influence what we observe and those observations then feed into our
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orientations. In other words, how am I orienting to those things that I'm observing? But what is it that may
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actually influence or drive my observations to begin with? So in any particular observing field in what we
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call observatory field there are going to be certain things that become more sentient or more salient to an
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individual based upon a number of things and those factors include their dispositions. I'll give you a perfect
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example. So again both both you and I shipmates former maritime military Navy and Marine
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Corps. So if if something resonates with you in terms of your prior experience
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being a shiporn sailor, the sound of a of a ship engine, the sound of aircraft
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engines, you're going to take a look at that. All right. So, you know, you and I have talked previously about some of the
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things I do as hobbies and whatever is I ride motorcycles or I used to fly airplanes. I hear an airplane and if
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that airplane sounds like a military airplane to me, I'm going to look at that versus the sound of, let's

say, a commercial airliner. Why? Because I have
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a predisposition to think, okay, that sounds to me like a military airplane going into burner. So, I want to see
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what kind of airplane that is. Does it sound familiar? Something I used to fly or not. Same is true if I hear sort of a
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rumble down the street. If I were not a motorcycle rider, I wouldn't be attuning to the fact that, well, okay, you know, is this somebody who's riding a Harley
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with good pipes? Did somebody put good pipes on something else? Same kind of thing. So, my predispositions flavor or
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influence what I'm going to observe. Once I'm observing it now those observations then feed into my extent
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orientations. So here we can think of dispositions as something primary instictive whereas those orientations
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secondary to observations are exactly that they are orienting and those orientations then relate back to some of
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those things that those prior memories may have infused and enthused. I I want to continue on this. So there's

Orientation as antenna: the brain as a time machine

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an idea that orientation may be an antenna that we may be connected to the outside world in some way. Uh I think
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you did wrote a paper on this a while ago. Can you talk a little bit about that? Is is orientation and I like to use the phrase orientana is that
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disposition how we look at the external world. Can can you build on that or or challenge me on that?
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Yeah. Well, I mean I I don't I don't think there's any challenge there at all. I mean I think you're absolutely right. I mean the the issue in this point is what are we?
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Mhm. I mean, as you know, there's a lot of discussions about what consciousness is. What is the nature of consciousness?
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Let's move away from that for a moment. I mean, one of the things that I'm working on with a colleague of mine in Germany, Professor Nico Kohl's, is what
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we consider to be a fundamental question that may in fact come through the backer side of the consciousness issue. Really,
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what is a nervous system? What is a brain? Yeah. You have to consider the brain and a nervous system to be a
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system of orientation and a system of relationality. It relates the interiority of the organism to the
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exteriority of the organism. It relates the past of that organism to the present and in some cases orients it
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speculatively and predictively to its future. And obviously it can do this by virtue of also orienting to
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dispositions, memories and codences of time and place. So again the idea of the brain as a time and space machine I
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think is a very useful rubric as as a very very useful as a
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learning construct to to be able to adhere to whether or not we can argue as is something is conscious something
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fundamental is it something generative I think also reflect reflects back to the
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idea that if we [clears throat] go back to the uristic of brain as time and space machine we have to then ask what
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is the brain doing right? How how is it doing this? And so you have to recognize
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there are three what we consider to be very plausible mechanistic actions of a brain or nervous system at large. Number
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one is that it does work as a generator of some sorts. It it's generating obviously various types of mechanisms,
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activities and processes that are involved in various forms of computation. And those computations
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ultimately are sophisticated enough to be able to allow and engage cognition. And as you get iterative forms of
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cognition, that sophistication can become forms of consciousness. Fine. [snorts]
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But there are some other issues that may be involved. Could the brain also work as an antenna
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where the brain as a physical structure once it achieves some type of physical
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configuration, some architecture or some set of contained architectonics?
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grabs things various forces that are present in the natural world both from
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inside of that organism and from outside channels it in some way and perhaps
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channels it into some generative mechanism. So the idea of the generator working in tandem or in

couple with what
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may be an antenna or an antenna resource certainly is plausible is viable. Could
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these things work in a way that might be mutually exclusive perhaps? Could they also work obviously convergently? Yes,
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very much so. But then we can get something that's even perhaps more passive than that. Is it possible that
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the brain is really a receptacle? That like any receptacle must have certain architectures, certain structures to
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hold whatever it is it's going to hold. But then once it holds that within the form of that architecture and those
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architectonics of its structure on a variety of levels, well that thing that's inside it takes on the form
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and in some cases the functions of the box itself of the receptacle. Is it
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possible that a brain once it reaches some particular state of architecture
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then achieves some function based upon what that architecture is able to capture in terms of various forces of
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the natural world and here too is this existing as a single set of functions
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and processes or is it existing in some way mechanistically and interactively convergently with antenna functions and
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generative functions and for for us for Dr. Kohl's and I what we've done is we tried to entertain all of those
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possibilities both singularly as standalones and what that might imply
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and perhaps pretend and as well in various forms of combination antenna and
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receptacle antenna and generator generator and receptacle generator by itself. In looking at what nervous
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systems do, I think the idea of the nervous system providing some level of antennization to the exterior world
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inclusive of not just what is a spatial world but temporally represents a a set
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of fundamental capabilities that any nervous system has to be able to work as a system of relationality. space, time,
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interiority, exteriority that is able to base past experiences as

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a fundamental resource or repository from which to estimate or engage the present and do so in ways that are
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predictive towards particular decisions and actions that are going to influence not only the present but the future. I I
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think there's a strong connection back to Boyd here. Uh he wrote a lot about MTS mind time space. I do want to point

Embodied cognition, mind and brain

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out something that when we talk about orientation, we're not talking about the the brain, the the the matter that sits
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sits between our ears. We don't equate that to that. We we look more like look at it as though it's part of 4D
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cognition. And maybe you can talk a little bit about that as well, but it's not central to what's between my head.
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It's it's where I put the boundary around my body or wherever I want to look at that particular udaloop. And
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that orientation is that 4E cognition. We're we're embedded within the environment. were part of that
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environment. We're extended in there. Is that consistent with the way you look at the the difference between a mind and
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brain? And and I want to bring up something else. I read recently that uh people that receive a heart transplant
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have sometimes have memories from the person they received that heart transplant from. So that's what we're getting at here. Uh can you talk about
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that? Is is that how you kind of look at this? Well, let's break those two out. All right. So let's take a look at that
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second point about memories being received from a heart transplant as subsequent to the primary discussion
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which is really what's going on with regard to the way brains work. Clearly nervous systems are embodied.
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Mhm. And I don't care what that body is. is I don't care if that body is essentially, you know, a very very uncomplicated
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organism, if you will, a worm, okay, or something far more complicated,

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a mammal, a primate, a human. Nervous systems exist within a body as embodied
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entities. Those nervous systems essentially grow up with that body, as
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part of that body. And the experience of whatever is going to be the environment
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or ecologies across time occurs based upon the filter that that embodiment
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provides. I can only know the world, truly know the world in the subjective
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first person as experienced by my nervous system in my body. You can tell
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me what it's like to be you. Mhm. You can relate certain things that you've gone through or you feel to me
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and I may be able to perceive that but ultimately my firsterson understanding
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is always going to be through the filter the band pass filter of my own experience as embodied in me. This is
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what the philosopher Thomas Nagel has referred to as sort of that that sensation of what is it like to be a
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bat. All right. In other words, one only knows that level of subjectivity. It it it is in many cases what the
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neuroscientist Antonio Damasio is referred to as the feeling of what happens. And that feeling of what
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happens happens within me. So again to reiterate, even if you tell me you're
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feeling a certain way or you're telling me something is happening, I'm not necessarily sharing the
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experience. I can't experience it as you. I can only relate to it as me. This
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is what in sort of older phenomenological philosophy is referred to as the distinction between
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explanation in the second and third person and understanding in the first person. We
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understand German phenomenology. We understand in the first person
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subjective because consciousness and our cognition is in fact always subjective,
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intentional and transparent only to us. And even when I can get things explained
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to me, I have to then relate that back to something I've done, some knowledge,
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some memory or some experience. So what ultimately happens is that
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understanding, true understanding is always fed through and interpreted by

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the filter of embodiment. Okay, point number one. Point number two is that the
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idea of embodied consciousness is a reality that again the the functionality
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of consciousness occurs within whatever is going to be that embodied organism.
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Now break break here for a moment. We could get into some very interesting and I think both grounded as well as
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esoteric discussions about what might that pretend for nonhuman consciousness and perhaps even non-organic
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consciousness such as that that may arise for example in a machine system and we could talk about that in a moment
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because I think that there is some value in the idea of differential embodiment and what embodiment means in terms of
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occupation of physical space not necessarily just an anthropomorphic or anthropomorphized body or even a mlo or
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even what I might call sort of organically carbon-based body. But the other question then is well what about
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inputs to that subjective self. So now let's get into that other issue about heart

Can a heart transplant change the self?

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transplant patients. Heart is an innervated organ. The question then is well what do we get when we get a
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transplanted innervated organ? might we be getting some level of neurological transmission from that organ that then
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feeds back into our system and how articulate, how ornate
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might that feedback be? Is it possible to be able to actually generate entire
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memories? I mean, memories of time, space, occurrence, specificity. I don't
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know. I mean, I I I'm curious. I mean, I think that a healthy level of skepsis
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might be called for here. Is it possible that an individual who receives not only a heart transplant,
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but perhaps any innovated organ transplant might have a sense
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of that organ's presence because that innervated organ now contributes back to

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the nervous system in which that innervated organ is now a part. Well, now you're dealing with sort of this
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older concept, the sort of Heracleitan concept of parts and holes and how they were relayed. And I think that there's
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something to that. I mean, clearly something that is contributing to a nervous system may have some element of
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presence and effect upon that nervous system. And if that nervous system is a system of cognition and a feeling of
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what happens, I would expect it it would certainly be at least feasible if not
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very possible that that innervated organ might contribute something back to the overall sense of the experience of
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having that nervous system and having a unique part of that nervous system now put back into it. Again, how ornate, how
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sophisticated, how granular are those sensations? Might there be entire memories of the other individual from
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whom that transplant has been derived of their life? I would be a little
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skeptical of that. Okay. Might there be some change in the way the individual who is now bearing that
27:15
transplant feels emotionally feels perhaps has a feeling
27:21
of self. I think that's very plausible. Let me ask you this. I didn't expect to go here

Attunement and exceptional cognition

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today with you. Let's get a little woo wish for a second. we'll get back on track. So, if we were looking at the at orientation as an antenna and we bring
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in this uh this heart uh and it now attunes us to something else in the environment and we'll call that outside
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information. There's some research happening now on the platonic space from Michael Leven that again going back to what you brought up
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but is it entirely possible that that heart now helps us attune to something that's in the environment and and we'll
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we'll come back to uh the cognitive warfare aspect here in a second. Remind me that question again. So by

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adding a new component to our orientation, a heart in this case, that comes with some type of attunement that
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is part of an antenna that we we talked about previously. That antenna, that orientation is
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connected to or or looking to the environment. And John Boyd wrote outside environment and and today we're learning
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more about something known as the platonic space from Michael Leven, a researchers in biology that are looking at this thing out there that's kind of
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controlling us or has some influence on us and it may have some connection. So by adding this component to us, calling
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it the heart, it it may provide us another way to tune to the environment. It's it's an attunement mechanism,
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right? And it's entirely possible, and again, this is a little wooish for this conversation. I get it, that these uh
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histories can be captured in some type of global consciousness. We're stepping way out of out of the space that we
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wanted to talk about, but I just sharing that with you as a as a thought and want to hear if you have any idea or thoughts on that. You know, I I'm not going to
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say it's it's a reach. I think that there's I think there are
28:59
certain things that we can well grasp. I mean, so be like a person's reach that exceed their grasp. Talk about reaches
29:05
and grasp. I think there are real grasp graspable verticalities to what we're talking about here. I mean, when you
29:11
when you take something and put it into a communicative system, I mean, a nervous system is a communicative system. The idea that whatever it is
29:18
you're inserting into that system may affect the pattern of communication and perhaps the system's awareness of how
29:25
that communication is now changing. I think that's very graspable. I think the idea that anything that changes what
29:31
might be the receptacle, the antenna and or the generator by adding or taking
29:37
parts away could certainly also change not only the function of that system,
29:42
but also the first person's subjective perception of that system's function. And then of course for

organisms that
29:50
are cognitive and that have some level of reflection of their cognition that have consciousness. I think that may be
29:58
viably apparent subjectively apparent. I think if we start to go a little bit further than that in terms of could this
30:04
also then change individuals external perceptions their capabilities you start to perhaps unscrew the Pandora's jar of
30:12
what may be sigh phenomenon. No, I think you know if we look to example for some
30:17
of Dr. Dean Raiden's work, very very good work. I I think that what tends to happen with nervous systems is of course
30:24
nervous systems as we know are somewhat precocial at birth. In other words, you
30:30
have more connectivity than one might actually need. And then as a consequence of lived experience, which then
30:37
essentially codifies patterns of activity and mechanisms within that nervous system, you see a relative
30:43
pruning of that precociousness in terms of structure that then begets function and function begets structure. Is it
30:51
possible that some individuals nervous systems allow for a broader range of
30:56
functions that we may consider even to be paranormal on the outside of that
31:02
normal Gaussian distribution? Yeah, perhaps and I would think that's that's very realistically. So some of our own
31:08
work for example with regard to exceptional cognition has demonstrated that. Yeah. Is there anything supernatural to it?
31:14
No. I I I tend to skew that. My thought is that certainly is quote paranormal
31:19
in the literal definition of what is sort of par on on the limits of what is
31:25
considered to be statistically normal for the way most individuals would have cognitive processes. Is that
31:32
cultivatable? Perhaps is that modifiable if you modify a nervous system perhaps.
31:39
Mhm. Might we then see that these types of changes to a nervous system through either addition or subtraction of part
31:46
of its architectures structures might lead to changes in function and those changes in function might not

only be
31:53
viable and it was functionally viable but also perceptive and perceptible.
31:59
Sure. Well, let's do this. Uh I know we spent a lot of time on we'll call this orientation. It's in my view it's

The cognitive domain: biological, psychological, social

32:05
critical that leaders understand how we perceive reality. what we understand about neuroscience and they need to take
32:10
a little bit of time to to digest that pred the predictive processing you know how perception the filters work things
32:16
that we just covered we but we're attacking the system now and and I'm going to bring up a slide here about the
32:21
cognitive domain and its dimensions that you introduced and I want you to talk a little bit about that um and and what
32:27
that means here just bring that share that with you everybody all right so let's let's move this conversation into
32:33
this space and why what we just talked about is important when we look at uh this type of warfare.
32:39
Sure. So, I mean, you've you've kind of launched us literally, real pun intended, into the domain of cognitive
32:46
quote warfare. Mhm. [clears throat] And at present, I mean, right now, as as
32:51
we're recording this, there's some ongoing debate about what cognitive warfare is, or is cognitive
32:59
warfare a thing, or is it just, for example, psychological operations or
33:05
information systems operations on steroids like scops or miso on steroids?
33:10
Is it influence operations with a new twist? Well, I mean, I think that the answer to that question is, well, yes. I think there are components of that but I
33:18
think that understanding the cognitive domain as being multicomponential I mean
33:24
certainly [snorts] becomes important to understand how the cognitive domain can be both a nexus as
33:32
well as viable target of and for influence on a variety of different
33:37
levels. Obviously we've known this for a long time. This is not earthshatteringly
33:44

new news. I mean we can take a look at quote influence operations uh anywhere from what I will call simple
33:51
propaganda. The idea of propagating little propagi to create to move to propagate something within the mindsets
33:59
within the sort of functional cognitive realities or at least attentiveness of certain individuals and collectives.
34:06
That that's old. I mean, very old. The idea of various narratives, various symbols being used
34:12
to be able to stimulate not only the cognitive processes of thought, but the
34:18
emotive aspects of cognition and the intentional, motivational, the cognitive
34:24
aspects of cognition. Again, very very old. But what I think is changed is the
34:30
level of sophistication, capability and granularity by and through which the
34:36
cognitive domain can be accessed, assessed and affected.
34:42
We have to consider any organism, any organism that has a nervous system to be
34:48
a triune. I mean clearly that organism is biological. And again I'm talking here about organic
34:55
organisms. I'm not talking about AI for example. Again, a wonderful discussion that could spool off into a whole bunch
35:02
of mental arabatics. But if we take a look at organic organisms, right, we know they are they
35:09
[clears throat] are that they are organic. They have a biological reality to them. They are biological entities.
35:15
Mhm. But you cannot engage that biological entity without the realization of its
35:22
environment. And that environment is social to that extent. In other words,
35:27
it exists within a relative set of systems. And that systems those systems
35:33
create a social millu, a social environ by which that organism is interacting
35:40
with other organisms of like as well as dissimilar type. And they're doing it in
35:46
certain ways that have particular structural rules, formatives, etc. Fine,
35:52
we understand that. And again, this happens from literally almost the point of the individual's birthing through all
36:00
its levels of relative socialization and interaction with conspecifics and non-consp specifics. What's

going to be
36:06
beneficial? What's not going to be beneficial? How do I need to act around family, friends, etc. What things in my
36:12
environment, in my social environment, can I interact with in a positive way? What need to be interacted with in a
36:17
more cautious way? Fine. The interlocator, if you will, the liazing piece between the biological and the
36:24
ecologically or environmentally quote social systemic aspect is that cognitive
36:29
reception and expression domain or dimension which is the psychological dimension and that psychological
36:35
dimension is the interface between thought inclusive of feeling and those things that thought then executes or
36:41
doesn't execute which is behavior. So we can take a look at any organism as a functional triune
36:48
three parts. Obviously the biological basis of that
36:53
the psychological aspects of both reception and expression that exist embedded in and vested and nested within
37:01
some environment that then provides the social dimension. So the cognitive
37:06
domain appreciating the cognitive domain as that ongoing interaction in real time
37:12
of biocschosocial realities becomes very important. Again is this brand new
37:19
absolutely not it is not. I mean we could take a look at some of the pioneering work in medicine of George
37:25
Engel talking about a biocschosocial model of medicine and that's axiomatic
37:30
to that model. But what what is new is the engagement of various toolkits and
37:38
methods to be able to assess, access and effect each of those domains
37:45
independently and conjunctively. So again, my area of of subject matter
37:52
expertise, if you will, is in the neurocognitive or in the the sort of neurobiiognitive dimension and domains.
37:58
And the figure that you you you illustrated for us comes from a paper that my colleague Dr. uh Dr. Robert
38:05
Schmid, Lieutenant General Robert Schmid, Marine Corps and I wrote that we have published in the

small wars
38:11
journal. The idea of reconceptualizing that domain, the cognitive domain as
38:18
those three parts also provides what I will call subtargeting domains
38:24
that very realistically in 2026 are viable and are valuable as targeting
38:33
dimensions. One can target for example the biological aspects of an organism to
38:40
affect their neurobiology neurohysiology in ways that influence the cognitive
38:46
dimensions of thought processing emotions that then can guide behaviors.
38:52
One can influence the psychological domain through things like narratives, memes, tropes, symbols, semiodics,
39:01
factors that can then affect an individual's psychological responsivity
39:06
to is occurring as a consequence of their underlying biology. So again, what
39:14
we're seeing allows the ability to assess each and all of those domains,
39:19
access each and all of those domains, and something that has become realized
39:24
at present that really then changes this idea of cognitive engagement into a
39:30
characterologically distinct dimension of what may be leveraged as warfare. So
39:35
apparently I'm running it now through my desktop, but of course I'm an NDU, so we don't we don't have camera allowances.
39:41
That's fine. Yeah. So, if you want to continue, we can just pick up and just do the voice over. Beside me, I've been told I have a great face for radio.
39:47
Ah, you do have a face for radio, Dr. G. I want to go back to your uh cognitive domain for a moment and just point out a

Biology beyond genetics: nature via nurture

39:52
few things. We're looking at a um image from uh John Boyd's earlier work and I'll I'll share a few other
39:59
um slides here in a second, but key to this is the the agent performer environment coupling, the the
40:05
system, the embeddedness of of what we're talking about. So when you're talking about genetics or biology,
40:11
um to me that's genetics, right? That's genetics. Um you [clears throat] have social in here and

psychosocial, I
40:16
believe, which I want to make sure I can get this correct. Is psychosocial just basically our our experiences,
40:25
maybe culture, and maybe a little bit of our biology or can you define that a little bit more? And same with social
40:30
because I want to make sure I I capture this the right way. Yeah. So so let let's embellish a bit on the whole what is biology. So to to sort
40:38
of limit biology to genetics I think is is problematic on a number of different reasons. First and foremost because
40:44
one's genetics actually does not determine linearly one's biological expression. Genetics realistically can
40:51
be considered to be something of a blueprint and the expression of that blueprint it its actual formation the
40:57
existence of what may be on that blueprint is determined by ongoing interactions with the environment
41:03
essentially throughout the lifespan on a variety of levels. So when we're talking about biology, yeah, we're talking about
41:08
genetics, we're talking about genotype, but we're also talking about expressed phenotype. And that phenotype again
41:14
occurs on a variety of levels from the cellular all the way up to the the systemic. And it's those ongoing
41:20
interactions on a variety of scales and levels with environments throughout the lifespan. in
41:27
some cases during what appear to be more critical periods than others that are going to determine how those genetics
41:33
are differentially activated to then get the expression of structural and
41:39
functional phenotypes which then lead to anatomy and physiological processes and
41:44
those physiological processes run the gamut from things that are actually physical in other words existing on the
41:49
level of physics through chemistry through structural biology anatomy etc. Okay.
41:55
Okay. So biology is more than genetics. And here too I think it's critical to
42:00
understand that even something as fundamental as the expression of various
42:06
genes is reliant upon an environmental interaction. An internal interaction

42:11
within various aspects of the organic body and various factors in the environment that then may be causitive
42:19
or in some cases inhibitory to the expressor of first particular genes and gene products. So the the birectionality
42:28
of the biological and the environmental is continuous at a variety of scales and
42:34
levels and extents throughout the lifespan. This is what has been referred to as nature via nurture. The original
42:41
concept was one was first mentioned by Adam Smith the the economist and then I
42:47
think more recently has been embellished in a wonderful book of the same title by Matt Ridley Nature via nurture. So when
42:53
we consider biology, it's very important to consider biology beyond mere genetics
43:00
to represent genetics as having in some way an important and componential part in biology, but certainly not all that
43:06
there is to that biology. Point number one. Point number two, the idea of the environment being multileveled and
43:13
multi-dimensional here too is crucial. And I mean that literally. It it creates
43:18
a crossroads by which those internal environmental factors that in some cases
43:23
may be predispositional such as genetics [clears throat] are then activated or inactivated or remain dormant as a
43:29
consequence of particular prompts from multi levels of the external and internal environmental interaction
43:36
across time. When we talk about the psychological domain, what we're really talking about is how an individual
43:42
receives information and both sensorally as well as cognitively perceives that
43:48
information and then encodes that information into the schemata of their cognitive processes. and then how those
43:55
cognitive processes ultimately will drive behaviors that are expressions of
44:00
those cognitive emotional states in response to certain environmental prompts on a variety of levels. So what
44:07
we're seeing is that the organisms component are essentially biocsychological and the embeddedness of

44:15
that organism of that embodied organism represent the biocsychosocial
44:21
componential remainder of that triune and again those things are essentially
44:26
inextricable. I I can never take the organism out of an environment. It is
44:32
always in an environment. Yes. and it will always relate to that environment inclusive of with other con
44:39
specifics organisms of the same type even if that choice is I don't want to
44:44
relate to any other organisms that's still a social relationship it's just a negative relationship so we have to
44:51
appreciate that that really does exist as a functional triune the organism is
44:57
those three things in one and they are multi-dimensional obviously things from
45:03
the environment enironment inclusive of the social environment can be processed psychologically to then feed into that
45:10
organism to affect their biology. Changes in the individual's biology can be sensed phenomenologically experienced
45:18
and therefore flavor not only firsterson phenomenological experience but also the
45:23
expression of what that experience may foster, generate and therefore prompt that is behaviors. And those behaviors
45:30
engage the environment inclusive of social environment with conspecifics and non-conspecifics. So again, it it's very
45:37
very difficult and in some cases not only functionally impossible, but
45:42
erroneous to try to pull those factors apart when considering the reality of
45:48
how organisms exist and engage throughout their lifespan in the sort of
45:54
real world consequences, circumstances, and contingencies of what would be the embodiment and embeddedness of that
46:00
organism. So I want to do this. So I'm going to share a couple of slides with you and main mainly our audience to talk about

John Boyd's sketches: environment inside orientation

46:06
the origins of the udaloop because everything you just described in my view can be um explained through Boyd's work

46:12
and and to do that I want to start with the environment. Uh these are some older sketches from John Boyd. I'm just going
46:18
to highlight a few things uh on the left side here and if you can't see those uh for those
46:23
so unfolding circumstances at one point John Boyd actually put unfolding circumstances from the environment
46:29
inside of orientation just like you described. Right. So, we're talking genetics, cultural heritage, and uh
46:34
excuse me, cultural traditions, and previous experience mixing with unfolding circumstances from the environment. He has that in there. He
46:41
he's always had an environment within the udaloop. And I think the way you drew it recently in in the in your
46:46
recent article is is spot on. I mean, we got to keep the environment part of the udaloop. And once people start drawing
46:52
the linear udaloop, which he actually did sketch and he said, you can't draw it like this because that's the
46:57
orientation drives everything. that generative model, those things you just described determine how we perceive
47:04
reality, how we sense, how we learn, how we adapt, how we decide, how we act. So, I'm going to build on this some more.
47:09
Um, again, we're seeing another iteration of John Boyd's uh work with orientation in the center.
47:16
Uh, of course, this is the one that's hanging up at the when you walk inside the um uh library at the Marine Corps uh
47:24
um not history, but the Marine Corp at Quantico. Yeah. So, you can see this
47:29
one. That's pretty standard. Uh, and then you get into some other ones here. This is the one that Chuck Spinny brought up and I want to bring this up
47:35
and make a point. Chuck Spinny makes it very clear that there are only two points that come in contact with the
47:40
external world and that's observations which are which John Boyd identified as
47:45
uh our sensory organs uh and then our actions those those actions that we take. So within the original the way we
47:52
should be drawing the udaloop it has an environment uh which is absolutely critical to understand how we engage

47:59
with the external world. We can't do that with the linear process that most people draw um the hudal loop with. So
48:06
here it is you you talked about genetics. Um the way I understood it is you're bringing in the environment which
48:12
Boyd called new information. Um we're engaging with interacting with the environment. That new information is
48:17
coming in. Uh it's it's hitting on our previous experience or building on that and you just described beautifully what
48:22
orientation is. Uh did you not is that not what you just shared with everybody? I'd like to think so. I mean I'm a big

Boyd was prescient: dispositions before observation

48:29
Boyd fan. So I mean if I were going to put on cheerleading costume that have a big B on the front, right?
48:35
I mean I look horrible in Bobby socks and please I don't want to show any leg. But yeah, I mean I think as as I've said before both on our discussion in our
48:42
discussions and and in print, I mean in many ways I think John Boyd was precient. He was able to see into
48:48
aspects of cognitive science that were really not yet well delineated, well
48:54
described or even wellknown based upon the the investigational toolkits that were available to him. Number one.
49:00
Number two, let's face it, I mean, I personally have been a scientist for almost five decades. And if you do
49:06
science, I mean, two things going to happen. and you're either going to be proven right over time or at least that
49:12
your observations, predictions, and deductions have been viewed as relatively correct and and standing the
49:19
test of falsification, validation, you've been proven wrong, right? I mean, Boyd has stood the test of time. And
49:26
what's happened, I mean, with any good theory is that the the core of that theory remains essentially unchanged.
49:32
You can bolt things onto it. you can take certain things off, but the core remains integral and integrative

across
49:40
a variety of of iterations. And that's held true for Boyd. So again, I mean, I'm breaking out my Boyd Pom Poms. I'm a
49:47
big Boyd fan. Yeah. What what we've added to that, what Diane Doulus and I have added to that in
49:53
terms of anything that's not even necessarily new, perhaps a novel take, is the importance of those
49:58
predispositional factors to observation. What happens is the the idea of
50:04
orientation is not just subsequent to observation but is in some way here's a
50:10
fancy word propedutic. In other words, it's almost introductory to observation.
50:17
It begs the cognitive question. What do we observe? What do we choose to
50:24
observe? And those processes can be multiffold and very often are based upon
50:30
predispositional factors that establish relative at least sensory biases,
50:36
framings, filtrations that then engage perceptual biases, framings, filtrations
50:44
that then create sort of this pre-orientation, if you will, that we call dispositional
50:49
biases that will essentially guide or at very least prompt observation.
50:55
Yes. What am I looking at? How long am I looking at it? What do I consider to be
51:00
relative signal versus relative noise or at least sort of ambiguous observations
51:07
that don't figure into what might be my quasi calculus to things that I need to orient to. And in fact, that was very
51:15
important. Yes, certainly for Boyd. But what we try to do is to really clarify
51:20
that based upon our understanding of basian processes to neurocognitive
51:25
mechanisms and then how that can also be affected for example by various types of
51:30
engagement. Uh you know we had Carl Fristen on the podcast and the free energy principle with basian updating uh

Active inference, Karl Friston, and orientation

51:36
predictive processing and active inference. And when we walked him through the original loop sketch, the
51:41

one we just kind of shared a few moments ago, the generative model being an orientation, he said, you know, that's
51:47
isomeorphic with active inference. So the dispositional piece I don't disagree with. I I think it's a way to explain
51:53
what John Boyd intended with orientation, which is to, you know, we talk about fractals on here and
51:58
attractors and affordances and things like that. Once you start talking like that to leaders, your their heads
52:03
explode, right? So I believe what you did is you gave them a way to understand Boyd's real udaloop by saying this
52:10
dispositional thing out front these dispositions drive the next orient or drive the next udaloop right rather than
52:16
we don't first observe then orient then decide then act our orientation determines how we perceive reality our
52:22
predictions it it can actually help us understand flow we use it to understand
52:28
uh TBI PTSD which might have another connection back to things that you're familiar with and we could talk about
52:34
that here in a second. But am I right in saying more than likely you had to use and you did this in 2011, I believe,
52:40
dispositions to help leaders understand that orientation drives everything. Is is that why it's there?
52:46
Well, I mean, let's face it. I mean, depending on what it is that you're reading of mine or that I wrote with
52:52
colleagues, it's written for a particular audience. Mhm. And you know as well as I do that if
52:58
you're pitching to an audience of military leaders who are thinking in these terms of of these constructs as
53:03
being valid and therefore of potential value in military contexts, you're going to use language that's relevant and
53:10
important. If I'm writing for a more neurocognitively oriented audience, the
53:16
language might be somewhat more different and be more resonant with terminology and concepts that are going to be part of that using toolkit. And
53:22
let's face it, if you're then going to go a little further and you're going to begin to write philosophically and start to talk about philosophy of mind,
53:28

philosophy of cognition, if you're going to start to talk about phenomenology and what that's all about here, once again,
53:34
some of the terminology is going to be more germanine to that camp and is going to be used in those ways that are far
53:40
more explicative of what's going to be relative and relevant to their orientation. So when we were using those
53:46
terms biases and dispositions, I think it became important because it framed it within the working realities of the
53:53
context of application, if one were to look a little bit more deeply and start to unpack what it was we were talking
54:00
about as we tried to do and in fact what we then did is we built reference upon reference both to our own work and to
54:05
others. But you know again this becomes somewhat more fractal in terms of who's doing what in the field and how those concepts and constructs then relate to
54:12
the things that we were propagating. So yeah, our our use of the term biases again very well qualified what bias
54:19
meant and dispositions referred to the fact that we were talking about a sort of something of a basian process that
54:26
goes along with the way cognitive processes engage such that familiarity
54:33
of prior experience then constitutes if you will a particular disposition
54:41
framework biasing waiting And this then gets into some other concepts such as relative hebian waiting
54:48
and what that means. The fact that you may have a system for example in organisms that's not necessarily a
54:54
fondoyoman system but more of a nonfunoyoman system where different components of what might be considered memory are distributed more widely and
55:01
as a consequence must come together. And that those things then create um at least some type of construct that would
55:09
then drive what an individual observes and how they observe it that then feeds into their orientation.
55:15
And to repeat, I mean not not to sort of be totally reiterative. I mean even a
55:21
simple example both you and I have been around airplanes for a long long time.
55:26
You hear an airplane. I hear an airplane. That's going to drive our observations because we may think,

55:32
"Well, that sounds like fill in the blank." Particularly if it's something unique, the person on the street who's not
55:37
around airplanes isn't going to be able to distinguish, well, what represents a military bird from a civilian bird. A
55:44
unique sounding military bird going into burner versus not. And they may not even look. Yeah.
55:49
So, it's not just a question of, well, what am I observing? For them, that may be relative noise. It's not something
55:56
they're even going to differentially observe. Whereas for you and I and perhaps others who were so oriented in
56:04
the past, those dispositions may then drive our observations. So for us what
56:09
we were really doing is we were taking the orientation step which was subsequent to observation
56:15
applauding Boyd and going you know these orientations are also predispositional
56:21
based upon prior experience given the brain working as a quote time machine
56:26
and that's what we do. So yeah I mean that that's that was our underlying justification for that.

Cognitive warfare targeting: top-down, middle-out, bottom-up

56:32
I love it. The uh again the big takeaway for the audience is orientation and environment are critical in John Boyd
56:39
Tudaloop. Um we the way it's drawn right now, the way it is shown um is is pretty
56:44
accurate. Just missing two points up here. I'll draw those real fast. Other than that, you've got you've got the right udaloop in here. So can um John
56:52
Boyd identified through reading the Toyota production system and things from uh um post World War II about command,
57:00
excuse me, control is outside and bottom up. Uh and here you have this slide we have top down, middle out, bottom up.
57:06
Can you talk a little bit about this and how it uh affects us in in cognitive war warfare? Yeah, I mean so again this is not only
57:12
cognitive quote warfare but the type of ways in individuals engage. So if we
57:18
look at quote bottom as those things that are foundational, structural and functional, now we're looking at those

57:24
things that are physiological, anatomical, right? Clearly our biology affects our
57:30
psychology. In other words, I'm not being a reductive materialist, but one can certainly make the statement that
57:36
our neurobiology on a variety of different levels is at least contributo,
57:42
if not directly substantive, towards our psychology. what we feel, how we feel,
57:47
what we know. And of course that psychology, those psychological aspects
57:52
then drive aspects of our behaviors that ultimately are expressive in how we
57:57
engage what may be our interactions with others, other things, other persons,
58:03
other organisms etc. So we can take a look at this saying bottom being most fundamental essentially most intimate to
58:10
the organism as an embodied organism are those things that are bodily biological. Mhm.
58:16
Vector between inside and outside is the psychological domain. Psychological in terms of both cognitive as well as
58:21
behavioral and ultimately the expression of those behaviors are going to have some type of externalized impact,
58:28
influence, effect. That's the social domain. Knowing that
58:34
clearly these domains can also become targetable entities. Yeah. So one can work from the outside
58:39
in andor from the inside out or affect the middle to be able to have some
58:46
inference and influence on both. So for example, neurobiological targeting
58:52
utilizing for example what our group has referred to as neuroweapons will directly and explicitly affect the
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nervous system per se to affect the functions of that nervous system which
59:04
certainly can modulate affect cognitions, emotions and behaviors. So
59:11
by targeting physiological effects of the neurobiology of an organism that
59:17
physiology can affect a variety of their constitutional elements inclusive of the
59:22
way they think, the way they feel, inclusive the way they feel in their body. In other words, do I feel well? Do
59:29

I not feel well? And in my feeling well or not well, how am I functioning? And
59:34
that can then affect not only their psychological state in terms of how they perceive their phenomenological
59:41
condition but how they act and how they relate to others. I can then take it the
59:46
other direction. I can work top down and I can engage social targeting
59:52
something as broad as literally an environment creating an environment that's relatively inhospitable
59:59
problematic etc. uh exacerbating existing environmental
1:00:04
and ecological conditions, affecting social dynamics, creating various forms
1:00:10
of social tension and conflict. And by so doing, I can then affect
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individual psychological reactivity. I can perhaps instigate in an environment
1:00:22
factors, variables that may be perceived as threatening.
1:00:27
And in so doing, I can then instigate or elicit sensations and perceptions of
1:00:34
dread. And those sensations and perceptions of dread can then
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essentially be correlated with physiological changes of what types of
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things are not only involved in the cognition but [snorts] in the physical
1:00:49
expression of that cognition. Here the proverbial fight orflight response. Once again going back to what neuroscientist
1:00:56
Antonio Damasio refers to as the feeling of what happens inside me. So we see how
1:01:04
engaging the three dimensions of the cognitive domain can be essentially exploited
1:01:12
to be able to identify various target vectors and then gain various targeting
1:01:19
solutions that will affect one or more of those targetable entities to be able to have a desired outcome in changing
1:01:27
what the cognitive domain is and affecting the underlying biology, the
1:01:32
psychological dimension and the social expression and engagement. So I wrote on there uh TBI down at and

TBI, neuroweapons, and "immaculate concussions"

1:01:39

I'm going somewhere somewhere with this. So you talked about the environment uh social targeting. So let's put this in
1:01:44
another uh domain if you will leadership. If I create the environment uh where it makes others feel safe to
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bring their full self to work, we call that psychological safety. Okay, that's that would that's that is that environment. I can create that
1:01:57
environment as a leader. So, I'm kind of I'm going somewhere with this. Um, at the bottom there, you have neurobiological targeting. So, let me
1:02:04
walk through uh traumatic brain injury. So, we have breachers. We have folks uh
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that in the military um have multiple concussions, you know, that that
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contribute to traumatic brain injury. It alters the way they perceive sense and act. So, um, from the lens of TBI, um,
1:02:25
can you take lessons from understanding concussive events and apply a method, a
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cognitive warfare approach or method that does something very similar? And I don't know if you could talk about that,
1:02:38
but I'm throwing that out there as um is there a way to replicate a concussive
1:02:43
event to create rapidly create the conditions that those veterans who are suffering from TBI and later on PTSD?
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Can you create that condition through a weapon? Well, I mean, let's face it, I could be the answer is really simple.
1:02:57
[clears throat] any weapon, any means of contending or dealing with others
1:03:04
that can influence their thought, their emotions, and their behaviors in ways
1:03:10
that are more consistent with what you want them to be. You that that's an Oxford English dictionary definition of
1:03:16
a weapon, right? So once again, if I wanted to actually affect a brain, I could certainly affect
1:03:23
a brain. I mean, I can put a round through somebody's head. Yeah. And that's going to definitely affect
1:03:28
their behavior. I can whack them across the head with a stick or I could do that in ways that
1:03:34
are far more insidious, perhaps subtle or even exceedingly overt. So the idea
1:03:41
of what things might be able to be leveraged as biochemical weaponry that affect the neural system, these are

1:03:48
neurowapons. Here, think of drugs, bugs, toxins, and devices. And to that last
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domain, devices, we certainly have to appreciate the use of selected forms of
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direct energies. Yeah. To affect neural function. And of course, as you may know, some of the
1:04:07
earlier discussions of that some 10 years ago were defining some of these injuries of individuals who had
1:04:13
downrange of direct energy devices as immaculate concussions. In other words, they exhibited the signs and symptoms of
1:04:20
a concussive injury absent what appeared to be the actual structural insult of a
1:04:26
concussion. And this was due to the effects of those direct energies, whether they were sonic energies or
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things along the electromagnetic spectrum that were able to significantly disrupt
1:04:38
neural cell and neural network and node integrity so as to be able to disrupt
1:04:43
cognitive processes inclusive of some of the emotional aspects of cognition that were ultimately important to a range of
1:04:50
behaviors, occupational behaviors, applicational behaviors, or just daily functions of activities of daily living.
1:04:58
But it is very likely that these things exist today. Um, oh no, no, it's not very likely. I mean
1:05:04
it it is it is a reality because a clear and present threat as identified by
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governmental agencies certainly much of my own work together with a number of other
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colleagues have recognized that the technological and scientific readiness level of utilizing various forms of
1:05:23
energy that can be directed in weaponizable ways has been something that has been viable
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for at least the past 10 to 15 years and certainly may represent weapon systems
1:05:34
in iteration. So something else we've been covering on here quite a bit is a constraintsled

Narrative as constraint: DARPA Narrative Networks

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approach in coaching. Setting the conditions in the environment, the constraints in the environment to influence the outcome. Right? So think
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of like mission command. We, you know, we have an intent. Uh we're explaining the what, but we're going to let the
1:05:51
performer or athlete discover the how. Right? So to me when when we start
1:05:56
looking at perception action coupling ecological dynamics, ecological psychology uh free energy principle
1:06:02
active inference and constraints approach and what we just talked about that social targeting uh can be done
1:06:08
through some type of constraints and I think you brought up narrative uh memes tropes and things like that. Um does
1:06:14
that resonate with you? Oh yeah, without a doubt. I mean you know again we we can sort of look a bit
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historically back to 2008 2009 DARPA had a program which was called narrative
1:06:25
networks and the idea of the narrative networks was to appreciate the biocsosocial reality of those
1:06:33
individuals who would essentially be targeted whether they're individuals or collectives of individuals and what
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types of things could be done to affect their cognitive processing to be able to
1:06:45
alter their decision-making processes, their actions affect attitudes, values.
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That was some of the early work that the program manager at that time was Dr. William Caseir. Um, a very very highly
1:06:56
trained neurocognitive scientist. And a lot of that work was based upon
1:07:02
some of the early work dealing with the effects of multi-dimensional propaganda. In other words, what types
1:07:09
of things could be used to affect individuals cognitive processing in ways
1:07:14
that might influence their emotional valance to then instigate particular attitudes, values, and actions. And if
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we take that further, the more we learn about the way neural cognitive systems function, even in terms of some some
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real subtleties, color, orientation of angle, various types of images, various types of
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caricaturures, again, memes, tropes, narratives. Each and all of these things
1:07:44
can be utilized as part of a larger sphere of engagement which is cognitive
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warfare as a multi-dimensional engagement space that can hit each and all of these different domains and
1:07:57
dimensions either selectively or in some combination. And these can be rendered
1:08:03
in ways that are very overt mean kinetically. The idea of utilizing, for example, a quote neuroeapon or direct
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and overt propaganda to be able to then influence individuals and collectives volatility to violence can be used
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clandestinely in operations that we know something went on there, but we don't
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quite know the who done it or covertly where in fact attribution in terms of
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was something done or not done becomes problematic, ambiguous, and as a consequence very very difficult to
1:08:35
respond to because proportionality of response is based upon attribution. So
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for sure the idea of cognitive warfare being multi-dimensional
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working within the cognitive domain is able to address each and all of these aspects these dimensions the bio the
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psychological and the social and do so across a spectrum of potential engagements non-kinetic to kinetic
1:09:01
covert to overt believe this slide here um bringing AI

Human-machine teaming, DoDD 3000.09, and synthcom

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into to this fight I think that's or human machine teaming or however you want to look at it. Uh but can you walk
1:09:13
us through what you're trying to uh get leaders to understand through through using uh machines or AI to help with
1:09:19
this uh accelerated udaloop? Yeah, this is some of the work that that I'm I'm doing with Dr. Alisa Net who's
1:09:26
working here with our group. I mean, some of the previous slides you showed came out of some of the work that I was doing
1:09:31
uh and still am doing with with Dr. Bob Schmid uh in in cognitive engagement,
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cognitive warfare. The work that I'm I'm doing with with Alisa Net really is is
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focal upon the interaction of human and machine systems primarily iteratively
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autonomous agentic AI. Mhm. You know, I I think the issue here is
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that we know working within military context that Department of Defense Directive 300009
1:10:02
mandates that humans be in the quote loop at that point by which artificial
1:10:07
intelligence systems are operative in the engagement of some
1:10:13
command and control functions, particularly those that involve belligerent action. Right?
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The question then becomes how. Right? So we have to appreciate that there are
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many aspects of the proverbial loop. There's being directly in the loop, multi-stage, multi-phase, continuous.
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There's intermittent looping where the individual is sort of on the loop but not in. There's near the loop where the
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individual the human is brought into the loop at key elements, key junctures during particular functions or the
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evolution of particular functions towards ends. And then there's the human out of the loop where now the the
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machine system is completely autonomous wholly functional across a range of
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processes that then ultimately lead to what may be computations towards execution of actions. Okay. The truth of
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the issue is that this this too exists along a relative spectrum. We here in the United States and among
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many of our scientific, technological, military allies are solidly and formidably committed
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to humans being at least on the loop, if not in the loop and being involved with
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regard to human machine system interaction. But the truth of it is is is how that
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actually occurs I think really needs to be somewhat more flushed out.
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Yeah. So, one of the things that we're very keenly aware of is that as you move
1:11:39
ever more towards iteratively autonomous and agentic forms of AI in these
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settings or perhaps in any setting, what you're seeing is perhaps a parsing of
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where you see human judgment and authority and machine computation
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towards some level of again hybrid computation, lateral as well as
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vertical, which may be considered considered some form of protocognition. I'm not talking in any way about
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consciousness. Protocognition, cognition based upon cognating certain actions
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based upon sophisticated computition computation that then may lead to
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executive functions. So again what we're seeing is that
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cognitive ecosystem whereby you're getting particular machine executed functions that may be
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assessment and analytic providing information to a human user to execute judgment and authority to then hand back
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to a machine system with regard to engaging particular types of orientations that may be relative based
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upon those observations. Humans then engage the observation to orientation to
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decision field and then may then parse that that capability back over to a
1:12:55
machine system for action. So once again at present that cognitive ecosystem is
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becoming increasingly reliant upon machine functions to be able to fine-tune observations in some cases to
1:13:10
extract signality from ambiguous background quote noise. Yeah. But the human is ultimately
1:13:18
responsible for parsing and creating various values and values to cedar upon
1:13:24
those observations. Those observations can then be fielded
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over to a machine system to clarify those observations and to yoke those observations to a
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variety of much more narrowed orientations that the human may then have to engage. The human then goes from
1:13:42
those orientations to decisions as part of a humanocentric system
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and then may then rely upon a machine-based system for the articulation of feed out actions. That's
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the current ecosystem. However, increasingly what's happening is we're becoming very much reliant upon
1:14:01
those machine systems across not only each one of the componential aspects of
1:14:07
the UDA loop, but each one of the actual functional processes of the udal loop.
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So what we're seeing is that machine systems are being involved not only in discerning particular things that need
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to be observed by the discernment of signal versus background noise and ambiguity but in all phases of
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observational clarification [snorts] as well as various phases, types,
1:14:35
levels, clades of orientation.
1:14:41
However, what we're arguing for is that throughout all of these multiple
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phasic dimensionalities of observation and orientation, the ultimate decisional authority must
1:14:55
rest with the human whereby ultimately that decision to engage a set of actions
1:15:01
can then be co-registered with a set of machine systems for clarification of those actions. Yeah,
1:15:07
we view this as a model of synthesized communication, command and control that
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we call synthcom. And that's what you see in the lower portion of this diagram. Our proposed
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cognitive ecosystem represents a more integrative and integrated cooperativity
1:15:28
of human and machine systems whereby levels of computation and cognition are
1:15:33
in fact integrated across multi-dimensions, multihases, multi steps and levels. And of course, one of
1:15:39
the ways we're doing that is through a relative forier type analysis of what
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goes into each one of those computational processes towards what may be the decision to then pass an
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observation to an orientation. And then within each one of those forier
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transforms, we're using what's what's referred to as fuzzy logic
1:16:02
or fuzzy set theory to be able to identify key variables and factors that can be differentially weighted. And when
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a particular tripping point is then meet met in each one of those particular dynamics, in each one of those phases,
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it brings the human into the loop. So rather than simply saying we get to a given point a binary
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go or no go where the human is brought into the loop, it represents a far more multiffactorial analytic and computation
1:16:30
by which the human can be brought into the loop based upon differential quantitative and qualitative weighing of
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key factors that are necessary with regard to the observational decisional aspects of observation orientation and
1:16:42
ultimately decision as a meta construct towards action. I I have a couple thoughts here I want to share with you. So when I see this here,

Cynefin, implicit guidance, and fuzzy sets

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this uh decision uh that automatically triggers me to or makes me think about the uh lower half of the udaloop. That
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would be the active inference piece, the novelty seeking piece based off of context based off the environment. Um
1:17:01
years ago uh at the Naval Safety Center, now Naval Safety Command, we walk
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through how uh mishaps occur and we use John Boyd's Utaloop and combined that with the the KVan framework. So when I
1:17:13
see um machines when I think about machines um and think about constraint
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approach and automating some things and habits of mind we want that implicit guidance and control pathway that
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bypasses that deliberate aspect of the udaloop to occur. And by the way Carl Fristen said that we spend 99% of our
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time engaging in that that pathway of the udaloop because we're not always in a novelty situation. Not always. Um so
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when the context is I I'll use the language of the canvan
1:17:44
framework when we're in a complicated domain where the relationship between cause and effect is known or knowable.
1:17:51
Uh generally we can bypass that deliberate part right we we don't we're not seeking any novelty and I think
1:17:56
that's what this kind of um points out to me. Have you looked at using any of the aspects of KVan to to help
1:18:03
understand context and help leaders understand where this works? Absolutely. I mean, again, if we're
1:18:10
going to get that way into the weeds, how are we how are we parsing out what are those factors and variables?
1:18:16
Yeah. Within what may be that fuzzy set that need to be incorporated within that set
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as necessary to be able to be part of that FA transform. In other words, if we're looking at the FA transform of any
1:18:27
particular set of subprocesses, right? So you take a look take a look at the UDA loop, right? So observation itself
1:18:34
has an UDA component to it, right? So of an observation, what am I observing within the
1:18:40
observation orienting to and making a decision to stay observant to that and ultimately that action is I'm locking
1:18:46
on, right? Yeah. So each one of the UDA loop components has subudas to it. And again what we're
1:18:52
essentially saying is you can do something called a fier transform. In other words, you can you can break out
1:18:58
subcomponents of what might be that curve of the udal loop into subcurves and then each one of those has
1:19:05
subfactors and subcontributo components and those factors and those variables
1:19:10
can be identified and you can then create those identification of those variables as part of a fuzzy set theory.
1:19:16
In other words, they're not binary per se, but each one of them is going to have a relative weighted value such that
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when a particular threshold in that factor's weighted value exceeds what I'll call X, that it becomes
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sentinel or salient. that by itself is not necessarily enough to trip the
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trigger go or no go, but when taken with other factors in that quote fuzzy set
1:19:42
may then create enough of a threshold weighted effect to then say go or no go.
1:19:47
So what we're what we're developing is a fuzzy setbased model of furier transform
1:19:53
analytics of the UDA curve the UDA loop that can be incorporated with human
1:19:59
machine teameming that essentially matches is equivalent to what human
1:20:04
cognitive systems do on a variety of scales and levels. So you have a a much
1:20:09
more uh intrinsic pairing of the human system that's engaging UDA and the
1:20:17
machine system that's engaging UDA inclusive of the dispositions and consequence weighing that can then be
1:20:24
combined into a far more integrated integrated system truly that is

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synthesized. It's breaking down certain parts of the existing thing and bringing them together in a synthetic way that
1:20:37
allows far more synthesized and viable and valuable communication command and
1:20:43
control when humans are interacting with these types of systems in these ways. So one of the things we've been looking at

Education of attention and the human-machine dyad

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is the the perception action loop you know the the skills development which is right here. So skills would be that
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pathway inside the udaloop. When we're talking about creating the conditions in the environment or the constraints, what
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that is doing is helping us build the implicit guides to control as athletes or the the folks that we're coaching.
1:21:07
That's the the pathway we want them to to build up, right? We don't want them going into a game um doing this stuff
1:21:13
down here. Um basic technical skills, if you will. When it comes to in in situ
1:21:19
when they're in the game, those technical skills and non-technical skills are these right up here. Right?
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That's that's what we want them to uh we'll call it habits of mind. We're not going to call it the muscle memory
1:21:31
anymore, but habits of mind. We're trying to build that pathway up. So, what this allows the human to do in
1:21:36
sport is see the novel connections that are happening and respond to them better. Um I believe that's the same
1:21:43
thing we want with machines is we want machines. We don't want machines down in here. I I I think that's what you're saying. Um because that's not how they
1:21:50
they operate. that the human in the loop dominates this aspect of of the udaloop.
1:21:56
Is are is that tracking with how you look at it? Yeah. I mean, essentially, if you take a look at this diagram, which I like very
1:22:02
much, you want to keep the human on the upper aspect of that, right? I I think
1:22:08
that's very important. What you're using the machine for and the way you're engaging the machine system is

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continuity of arrows between the upper domain, implicit guidance and control. Mhm. and the lower domain which is
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unfolding interactions with the environment in real time. What the machine system is able to do is to
1:22:27
provide what has been colloally referred to as machine speed with depth analytics that then allow for
1:22:34
a greater informing of what may be implicit guidance based upon certain explications of variables that are
1:22:41
important to inform that implicit guidance. And that becomes true birectional cooperivity. So what you're
1:22:48
getting is a reciprocally complimentar reciprocal complimentarity of the machine human machine interfacing as a
1:22:56
true diad. It is it is truly diatic and working towards that diadism
1:23:02
requires that sort of dialectical synthetic process where certain aspects of both
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have to be reconciled to be able to come together in something that is greater than the simple sum of its parts.
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There's a phrase coming out of um uh ecological psychology. They call it uh education of attent education of
1:23:22
attunement and attention, right? So that's this right here. You're going to teach the machine what to pay attention
1:23:27
to, right? Yep. That that's exactly it. In fact, that's where we that's where we were driving a lot of this because we're so
1:23:34
we're so importantly vested to the idea that you're creating a new ecology when you establish this true diad of human
1:23:41
machine dimensional and very dynamic interaction. That is a new ecosystem.
1:23:46
Right. Right. I mean literally I mean we're taking the word oos locos household and rational
1:23:52
accounting of that. So that oos logos that that ecology
1:23:58
has to account for both of the members of the household if you will the human
1:24:04
component of the household and the machine component of the household. You can't do these things separately but to
1:24:09
integrate them that really is what you're doing. So again I mean much of the the work that came out of uh

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ecological philosophy and ecological psychology I I think is important to understanding what this new ecology and ecosystem of
1:24:22
the human machine diad is going to be whereby the cognitive process represent the vector by which those things are
1:24:28
working together. It's probably a lower energy approach to train a machine to pay attention to things in the
1:24:33
environment to the sensors than it is to do that for the human. Right? is is um I
1:24:38
mean let's go back to aviation. Uh when we're flying, when you're taking a new student through uh BFM, you come back
1:24:44
and realize quickly that they're, you know, their their situational awareness is this little box, right? And
1:24:51
you got to get them to open up to see uh what actually happened so they can pay attention to what's going on the next time they're out there. And that takes a
1:24:58
lot of energy to do. That takes years. It takes a lot of money. We know how to do that. We can train a machine how to do that. So So that's uh I think that's
1:25:05
where you're going with this. And I'm just using that analogy that when in sports, this is, you know, that that
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education of of attention is what we're trying to do by coupling the training
1:25:16
with the athlete, right? We don't want to do cone drills. We want to put a um a real person out there that they're going
1:25:22
to defend against or play basketball against or whatever sport it may be. It's the same thing with machines. If we got to give them the the the context,
1:25:29
the environment to to build that u education or Yeah. education of
1:25:35
attention up so they can make more sense of a changing environment. Exactly. Right. Okay. But you are getting that for by
1:25:42
the way I think um what's the lieutenant general's name again uh at ASU? Yeah. Yeah, I mean, you know, we we work
1:25:48
with not work, but we've had um Rob Gray who who's right out of ASU on ecological
1:25:54
psychology, ecological dynamics and constraints approach. That's that seems to be the center of all this. And I I see the overlap with what you're
1:26:01
saying and what they're saying. And to me, I I think this is an awesome opportunity to bring all these folks

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together and go, this is how we build a high performance organization with
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machines and humans, right? And foundationally and this I'm biased towards this a great way to explain that
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is the real udal loop. We can we can use that as a foundation to build that and go look perceptual perception action
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coupling is inside the udal loop. It's right here right it's this this pathway there and then our skills development is
1:26:32
right here. Um we understand that that means we have to create the conditions in the environment to get what we want.
1:26:39
So think mission command intentbased leadership and all that. That's what we're trying to do as leaders is create the conditions, set the constraints to
1:26:46
build those skills, that implicit guys and control skills up. Again, I'm just
1:26:52
saying I'm saying it out loud out loud. If there's any value in the udaloop, it's bringing these disparit domains
1:26:57
together to help people understand how you build a high performing organization and how you defend against what's going
1:27:04
on in the world around us. I agreed. I [clears throat] mean, it and it's all it's it's not even contingent.
1:27:10
I mean I think it's all contextualizable to whatever organization or situation you're putting that in. So whether it's
1:27:16
training individuals, whether it's developing leadership skills or whether you're developing what might be the
1:27:22
diatic componential aspect of human machine system. I mean they all they all
1:27:27
figure well into this. So again I mean cheerleader outfit comes back on. I'm doing the John Boyd dance. precient not
1:27:35
only in terms of what humans are doing in those unique situations of rapid turn and burn, kicking the stick and rudder
1:27:41
around in ACM combat maneuvering, but I mean also very precient to the fact that this sort of represented the
1:27:47
next frontier of where cognitive sciences were going with regard to not only what humans are able to do and how
1:27:52
we're appreciating what the cognitive sciences can offer in terms of human behavior in a variety of

different
1:27:57
occupational and avocational contexts, but also the interaction of human machines and the way machines are doing
1:28:03
their computation. to cognitive processing and what that then infers. Hey, last question. I kept you here for

Leadership manipulation and cognitive warfare

1:28:09
a while. You brought up leadership. I'm going to ask you this. Leadership man manipulation and cognitive warfare. Um,
1:28:14
is there a big difference? Well, I think I think one of the goals
1:28:19
of cognitive warfare is leadership manipulation through the engagement of each one of those dimensions either
1:28:26
singularly or in some combination to be able to affect attitudes and values that are ultimately going to be important to
1:28:31
the cognitions and behaviors of the leader that are then expressed to those the leader is leading.
1:28:37
All right. Well, I tell you what, I appreciate your time today. Uh definitely want to spend more time with you on a lot of this. So I think there's
1:28:42
a lot of overlap with uh the folks that we've had on the show from the ecological dynamics aspect and then of
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course the the active inference piece basin updating predictive processing. We've had 180 some episodes uh since we
1:28:54
launched and I don't see us stopping anytime soon and right now we've been exploring cognitive warfare. Anything else for our audience? Anything else you

The four R's of cognitive security and CBRN

1:29:01
want to share? You know I I think one of the the appreciable points is that the cognitive
1:29:06
domain is applicable across the range of CRNA. Right? I mean, we talk about cognitive warfare and cognitive
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influence and perhaps cognitive security, which I think is the flip side of that. If we know there's cognitive
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engagement and influence, what can we do to fortify what our group refers to as
1:29:24

the the four Rs? What is going to be the the reception, resistance, resilience,
1:29:29
and response to these types of cognitive engagements? And that's cognitive security. I mean, that that's a lot of
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the work, for example, that Matt Canam is doing with the cognitive security institute. But I think what's really
1:29:40
important is that this is not just a singular kind of proceance of quote cognitive warfare per se, but these
1:29:48
cognitive factors and cognitive variables are also very operable across chem, bio, rad, nuke, and even explosive
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forms of warfare engagement because they affect and are affected by existing
1:30:02
narratives, values, attitudes towards each and all of these various approaches
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in the toolkits of waging belligerance. So we see the CBRN spectrum as being
1:30:14
dynamically interactive with the cognitive spectrum, not only as an aspect of biochemical warfare and
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engagement and perhaps the SCOPS that goes along with it, but also with regard to the larger narratives, the global
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narratives that are important to informing things like policy, doctrine, governance on a on a scale that is very
1:30:35
influential to the conduct of peace and belligerent operations worldwide.
1:30:41
Wow. Uh absolutely fascinating time to be uh alive. I know there's so much more we can go into. Uh where where can

Where to find Dr. Giordano's work

1:30:48
everybody find your work and and uh what's coming up next for you? Any new articles coming up anytime soon? Yeah, we got a lot of things. We're
1:30:53
turning out a lot of stuff. I've worked with a wonderful research team. You know, my thought is research is all about the we and us. It's not about the
1:31:00
eye. And I have the great fortune and wonderful blessing of working with some very very very intelligent [clears throat]
1:31:05
people. You know, we put out a weekly informational series called Strategic Insights. That's coming out of the
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Institute for National Strategic Studies here at National Defense University, coming out of our group. And you know, we're trying to publish widely. We try

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to get our stuff into Small Wars Journal, and to other sort of peer-reviewed journals that are viable not only to the military and
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intelligence literature, but also to the scientific literature and the philosophical literature, because I
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think the the the nature of what it is that we're doing appeals to those broader audiences at large. And again,
1:31:36
if people want to get in touch with me, they can reach me either at james.j.jordano.ndu.edu
1:31:44
or they can reach me at james.jordano at georgetown. Perfect. Uh your name's come up several
1:31:50
times in the last few weeks. We've had uh let's see, Fliflana Pavlaska on from Ukraine. Uh she's been
1:31:58
work on on looking at what you've been writing. We had Sarah Russo on and of course we've had Orian Cohen on and uh
1:32:04
her episode will be coming on soon. So your name's been popping up all over the place and appreciate you coming back on.
1:32:09
We'll definitely have you back on soon. But for now, hey, thanks again, Doc. And we'll I'll keep you on here for a moment. Yeah, it's a privilege and an honor.
1:32:15
Thanks so much for taking an interest in my work. Bye. What am I getting at? The underlying

Closing: John Boyd, "There is no way out"

1:32:20
message is very simple then. There is no layout.
1:32:27
Unless we can eliminate the feature just cited. [music] Well, Bob know we don't know how to do this.
1:32:36
[music] There is no layout.