Dr. Winston Ewert: The Human Mind's Sophisticated Algorithm And Its Implications

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Pat Flynn:

Okay, everybody, welcome back to the podcast. This is your host, Pat Flynn, teaming up again with the awesome team at Mind Matters to discuss all things philosophy of mind. Today, we are joined by Dr. Winston Ewert to discuss his very good contribution to the Minding the Brain volume called The Human Mind's Sophisticated Algorithm and Its Implications. Lots of great stuff to discuss here. I'm sure we'll nerd out on some cool topics related to the nature of the human person and human cognition and all that good stuff.

But Dr. Ewert, this is the first time that we have had the opportunity to speak. I'm looking forward to it. If you wouldn't mind, I would love to just hear a little bit about your background. I'm sure the listeners would as well. So who are you? What do you do? How did you get into all this philosophy of mind business?

Winston Ewert:

Well, basically I am initially a computer nerd, so I grew up being very interested in computers, studied computer science. As part of that, I eventually became interested in the subject of intelligent design by way of computerized simulations of evolution. And this led me to getting a graduate degree at Baylor University, where I worked with Robert Marks. And so that led me to be involved in intelligent design. And then I was asked if I would be interested in contributing a chapter to the Mind Matters book, and so that led to me developing the argument I put forward in the chapter, and that's how I got into the philosophy of mind and that thing.

Pat Flynn:

Yeah, fascinating. Just not to veer too quickly off of topic, but what was your experience like when you were working with computer simulations of evolutionary theory? Tell us a little bit about that, the work you were engaged in or research you were engaged in. And what surprised you about that work or research?

Winston Ewert:

What surprised me? Yeah, so I came to it from a perspective of someone who was already on the intelligent design side of things, and therefore I was skeptical of the claims being made about these computer simulations. And so I was taking them apart and seeing how they worked. And so, as someone who was a computer nerd and did programming and that thing, I was well-suited to take it apart and look at the details of these things and find, well, they're never quite what they're presented as because they're not really simulations of a naturalistic process. They're simulations of a very intelligently guided process that has a lot of intelligent agency involved in the setup of the system to make sure it does what they want it to do. And then they take it and present it as, "Hey, look, evolution is working." And it's like, "Yeah, that's not really what's happening there."

Pat Flynn:

Yeah, that's an interesting point and something that a lot of people might not fully appreciate. So when you say that there's a lot of clearly intelligent input into a lot of these simulations and models, can you just give us a few to help people understand what you mean by that?

Winston Ewert:

Yeah, one example, there's a very famous example from Richard Dawkins's book, The Blind Watchmaker, where he evolves the phrase, "Methinks it is like a weasel." And that might be impressive except for the fact that what he did is just say, "Well, phrases that are more similar to me thinking it's like a weasel, no matter how dissimilar they are, but if they're a little bit more similar to that, natural selection would favor that." And then it very quickly converges on, "Methinks it is like a weasel." But that required that idea, the target phrase, to be pre-programmed into that simulation and to define all sense of selection based on similarity to that, which very much not really what an evolution would do realistically.

But you could look at other cases, like there's a paper I wrote on Steiner Trees. And someone had written this simulation and was very loudly proclaiming that it demonstrated the power of evolutionary processes. But then when I would look through his code, I'd find things like they had overwritten how many points there were in their Steiner tree away from randomness to something that would better fit what they were trying to accomplish. And they would restrict the locations of points and have all these extra rules in there which serve no purpose but to aid the evolutionary process towards the goal he was trying to reach with it.

Pat Flynn:

Yes, okay. So that's helpful, and that's certainly interesting I'm sure to, well, everybody in general, but especially to listeners of this podcast. So is it fair to say that a lot of what's going on with these simulations involves just specific fine-tuning of certain things to generate particular outcomes that one is aiming at?

Winston Ewert:

Yeah, so certainly that's a very common feature. You find these specific, I call them teleological fine-tuning in these simulations. That's very, very common when I look through them.

Pat Flynn:

Yeah. Okay, interesting. Well, that's obviously something that could be an entirely separate conversation, but thank you for entertaining me there for a moment. Now turning back towards philosophy of mind, of course all these things are generally related, you've got this article, this very cool article called The Human Mind's Sophisticated Algorithm and Its Implications. So you gave us a little bit of background on how you got involved in this project, but yeah, tell us a little bit more about the general overview of this article. What are you setting out to accomplish? What inspired it? What things do you think we need to know by way of background before we start actually diving into some of the details here?

Winston Ewert:

The basic idea that I took here was to say, "Well, let's consider the human mind as a computer." Now, I think there's more to it than that, I think particularly explaining consciousness, but I think when you look at human intellectual ability, our ability to do math or reason through things, we could model that as a computer running a really sophisticated algorithm. And then we look at, well, what would that algorithm... If we think about that algorithmically, we can apply what we know as theoretical computer scientists to that algorithm and what that would actually tell us about the implications of humans running on a very sophisticated algorithm.

Pat Flynn:

Okay, good. So let's start at the kiddy end of the pool and help people just become familiar with some more of the background and a few of the terms. And we can dive into some of the technical weeds of your argument, which is very fascinating, your overall paper. So I guess the first thing to consider is that there is a certain model out there, computational theory of mind, that is often proposed to explain human cognitional ability. And it's certainly an interesting model. It's a very popular model, at least among certain types of thinkers. And it seems to have become of increasing interest lately, especially with AI and all that stuff, which we can talk more about as we move along here.

But early on in your article, you make the very useful division when talking about the human person, the human mind between different aspects of the mind, between phenomenal consciousness and cognitional ability. And I think that's probably a good place to start because these are different features of the world and the human person that may or may not require different explanations, so I think it's important to at least break these apart conceptually before we start to see if they succumb to the same analysis. So help us there. How should we start to divide the problem up, if you will, and then how it relates to computational theory of mind?

Winston Ewert:

The two aspects in particular I look at, you've got the phenomenal consciousness you mentioned, and then the problem-solving cognition. When you're looking at phenomenal consciousness, that's like your first-person experience. You know what it is to feel cold or delight at solving a problem or happiness or the experience of seeing things with your eyes. You actually experience these things, and you have that experience.

Pat Flynn:

The what it is likeness to taste chocolate-

Winston Ewert:

Yes, that sort of thing.

Pat Flynn:

... or hear a symphony or something like that, right?

Winston Ewert:

Right, and that's obviously something we have firsthand experience that we do that. And the other thing, you have the problem-solving cognition, and that's anything you can reduce to answering a question of some sort. So you can think like, what is two plus two? Or is this a valid logical argument? Or is it likely, given the fact that the sun has risen every day of my life, that it's going to rise again tomorrow? Those sorts of things, they're intellectual things. You see that's quite different than experiencing something because you're coming to a conclusion based on your data, and that's what I think is the problem-solving cognition side of it.

Pat Flynn:

Okay, good, good. Let's take a look at the first one, which you don't dedicate all that much space to because you think that the question sometimes isn't particularly well-defined in certain respects. So how should we think about human phenomenal consciousness? Is this something that can succumb to a materialistic or computational theory of mind? What are your thoughts on this?

Winston Ewert:

Yeah, well, I think that if you think about consciousness, and if you're trying to reduce it to computation, to me that's like trying to reduce it to math equations. So I'm pretty sure that the quadratic formula isn't conscious.

Pat Flynn:

I'm with you.

Winston Ewert:

I actually have run across some people who actually dispute that, and I don't really understand their mindset. But I'm starting, I think for most people, common sense says math formula isn't conscious, and computation at the end of the day is just basically math formula. And so I think it doesn't make any sense to say that the abstract notion of computation could be conscious. Now, I think you can then say, "Well, where does consciousness come from?" And I think you could say, "Well, whenever you build a computing machine in the real world, there's consciousness generated as a side effect," or something like that. That's somewhat different than what I'm saying here. That's not like the abstract computation itself generates consciousness, but somehow the rules of the physical world cause consciousness as a side effect.

Pat Flynn:

That it somehow emerges once a certain degree of complexity is attained or something like that.

Winston Ewert:

Something like that.

Pat Flynn:

Yeah, obviously I think we're both probably skeptical of that, but it's important, as you say, that these are different sorts of proposals, right? Yeah. I mean, that seems right. That seems definitely right that that would be almost a serious, profound confusion of categories to think that phenomenal consciousness is just somehow equational. I'm with you there. So could it be physical? That's a different question as well, isn't it, Winston?

Winston Ewert:

Right, so that could be a different question of there could be physical. Maybe there are consciousness particles that exist that are responsible for generating it, and we just haven't found them yet. Or maybe there's a non-physical world that's interacting with ours. Those are possible ways of doing it.

Pat Flynn:

Good, good, good. Okay. So is there anything else that, for our purposes, for your article that needs to be said about phenomenal consciousness?

Winston Ewert:

There's not really anything further. I basically just distinguish it in the paper just to say, "I'm not talking about this," focusing on the cognition and problem-solving side of things.

Pat Flynn:

And the problem-solving ability, great. Okay, good. All right. Hey, here's a question that maybe we should have gotten some clarity on right at the beginning. What's an algorithm? What do we mean by an algorithm?

Winston Ewert:

So an algorithm is essentially a step-by-step procedure that can be followed. It doesn't require any creativity or intelligent choices. You just follow the procedure. So when you were taught math as a child, you were probably taught to follow, "Here's the certain procedure you follow in order to do long division or multiplication," or whatever it is. You don't get to make any choices during that decision. You just have to follow those particular rules, and that's what an algorithm is. It's just this set of rules that you're following that requires no creativity. You just follow the defined procedure.

Pat Flynn:

You made this very interesting and important historical note in your paper that computers were originally humans.

Winston Ewert:

That's true.

Pat Flynn:

Yeah, so give that little detail for people. I think they might find that fascinating.

Winston Ewert:

So computers historically were originally people who were following these procedures. So because we hadn't figured out how to build electronic computers yet, they would actually have large groups of people, and they would give them these calculations to follow, and they would follow those procedures. And that's somewhat where they were developing the theory of algorithms was they would have these people, and they didn't want a bunch of math geniuses that they had to hire to do this work, but they would hire people who just had the ability to do your basic math calculations and give them, "Here's the procedures you follow, and you go and you do that." And so that was even used I think in some of the early space Apollo missions. They actually even were still using banks of human computers to do some of their calculations.

Pat Flynn:

Yeah, that's cool. It's fascinating to think about, and certainly we've advanced a little bit since then. But I mean, fundamentally the mechanics are still the same, right?

Winston Ewert:

Yeah. Fundamentally it's still the same. All we just figured out is, oh, for these really straightforward mechanical things, we can build a machine to do that.

Pat Flynn:

Yeah, very cool. Super fascinating. Okay. All right, so let's move forward mean. So your general thesis seems to be that you're quite sympathetic to the idea that the human mind, with respect to the cognitional side, the problem-solving side, is a very sophisticated algorithm. But this isn't particularly good news for, say, reductive materialists and atheists and neo-Darwinians, right?

Winston Ewert:

Yes. I think once you actually think through the implications, which we'll get into, it's actually very problematic for them.

Pat Flynn:

Yeah, and I wanted to pick that out because I think a number of people, a lot of people who think about this, are resistant to the idea of saying that this aspect of us is algorithmic. So you part ways with some of those things.

Winston Ewert:

Yes, I part ways probably with many of the other people in that volume.

Pat Flynn:

Yes. I just wanted to hang a lantern and flag on that, but that's good. It's good to get this diversity of thought, but ultimately you guys are winding up in the same position. Obviously, if people think that this is non-algorithmic, then this throws different models that are very much favored by reductivist, materialist type of thinkers out the window. But you're taking a different route, a different strategy here saying, "No, we can accept and there are some reasons to accept that it is algorithmic," but the implications of that are still rather negative and dire for those particular worldviews. Is that a fair summary?

Winston Ewert:

I think that's a fair summary.

Pat Flynn:

Okay, good. All right, let's start making your case, Winston. Where do we begin?

Winston Ewert:

So I think that what we begin with is discussing what I call the uber task. So computer scientists, we study something called the halting problem. And the basic idea is if I give you an algorithm, and I ask you, "If you were to follow this procedure, would you ever actually finish, or would you keep following the procedure forever and ever?" So I think I have an example in the chapter where it's like step one, dance a jig, and step two, go back to step one. And if you were to follow that procedure, you would never stop dancing your jig because you'd keep going back to step one and just repeat itself forever and ever.

And so that's of course a very trivial example, and you could look at that very quickly and say, "Well, this doesn't halt. It never finishes." But if you had a step one, dance a jig, and step two is, repeat the first step a thousand times, you can look at it and say, "Well, it would take me a long time, but I would eventually finish."

Pat Flynn:

But it would halt, right.

Winston Ewert:

It would eventually halt. And so we think of there as being two possible kinds of algorithms. There's those algorithms which halt and those which don't.

Pat Flynn:

Got it.

Winston Ewert:

And so we call differentiating those the halting problem. And it may seem like that's a kind of esoteric and boring question, but the key point is that by selecting different algorithms, we can actually use that to define pretty much any kind of cognitive problem. It can be described as an instance of the halting problem. So we can take it and say, "Here's an algorithm for which the halting problem is equivalent to that original question."

Pat Flynn:

Okay, good. Do you have an example or way that you like to illustrate this or get this across to people?

Winston Ewert:

Yeah, so one of the examples in the chapter, I think I talk about the Goldbach conjecture. And so the Goldbach conjecture says that every even number can be expressed as the sum of two primes. If you have 88, it's 17 plus 71, that sort of thing. And it turns out, for as many numbers as we've checked for all even numbers, you can always find two primes, add them together, and get to that number. We've never actually developed a mathematical proof for this. It just empirically looks to be true for everything we've tried. We don't know, maybe there's a counterexample that's really large.

And so you could ask the question, "Is the Goldbach conjecture true?" Which is that, this is true for all numbers. Now, you could write an algorithm out that says, "Look for a counterexample." So start with two, check if the Goldbach conjecture is true. Go to four as the next even number, check if the Goldbach conjecture is true. And then you could just repeat that over and over again going through all the numbers. And so if the Goldbach conjecture is true, that will never halt. It will never finish because it's going to keep looking for a counterexample.

Pat Flynn:

Sure.

Winston Ewert:

But if the Goldbach conjecture is false, then it's eventually going to halt. And so if you could quickly and easily solve the halting problem for any algorithm, you could determine whether that's true or not just by writing out that algorithm and doing your halting check on it. And so that's an example. It turns out there's lots of different issues in number theory that you could check this way by looking for a counterexample.

You could also take, for example, if you want to say, "Does this conclusion logically follow from these premises?" And you could write an algorithm that says, "Well, let's systematically try every possible proof to see if we can find a proof that makes this work." And then if you can't find a proof, well, that's never going to halt because it's never going to find a valid proof. But if there is a proof, it will halt. And so again, actually, if you could solve the halting problem, you could check, does this halt, will I find a solution? And then that would tell you whether or not there's a proof for whatever it is that you're looking at.

Pat Flynn:

Okay, good. All right, so that's a clear illustration of the problem. So what's the connection here for human cognition and computational theories of mind and trying to answer the question of whether it is algorithmic or not?

Winston Ewert:

Right, so the case that I'm making there is that, for any of the cognitive tasks that we're interested in, you could express it as a version of the halting problem. And so we can think of it, humans are able to solve some of those problems, not all of them. We are not able to prove whether or not the Goldbach conjecture is true, but there are many other ones that we've pretty well convinced ourselves are true because we've constructed proofs for it or whatever. And so the one way of thinking about humans then is that we're partial halting detectors. We can determine whether some subset of programs halt or algorithms halt, but we can't determine another subset.

Pat Flynn:

Yeah, I see.

Winston Ewert:

Now, the set we can determine is pretty large and sophisticated, which is why I say we have must have a very sophisticated algorithm, but it is still limited. And that's the intuition that to me makes me sympathetic to the human mind being algorithmic because we know the same thing is true if we were to build an algorithm to solve the halting problem. So it's one of the foundational proofs of theoretical computer science is there's no algorithm that can solve all halting problems.

Pat Flynn:

Okay, all right. I see. So that connection is becoming clear to me and hopefully to the audience. Obviously, as you said, a number of people even in this volume resist the idea that all human cognitional ability is algorithmic. So in your consideration of these dear thinkers who take a different route than you, Winston, what do you think are some of the most perhaps problematic considerations for your particular theory? And how do you think about those?

Winston Ewert:

Yeah, so I think in my view, when a lot of people are looking at this, what they do is they're implicitly in their mind considering human abilities versus a relatively simple algorithm. So they're like, "Well, humans are way, way better than our best algorithm at finding mathematical proofs."

Pat Flynn:

Sure, so it's a difference in degree, not kind necessarily.

Winston Ewert:

Right, but to me it's like, well, yes, but the question isn't really, are humans smarter than our current algorithms? And the answer is absolutely yes. But are humans smarter than any algorithm that could exist?

Pat Flynn:

And you're saying not necessarily, right?

Winston Ewert:

Not necessarily. And in particular, we can know from, if we think of cognition as solving some subset of the halting problem, we know you can always take any algorithm capable of solving some halting problems and expand it to detect more halting problems by simply adding onto it. We say, Well, here's a pattern of things that we know halts. Detect that pattern as well. Or here's a pattern of things that doesn't halt. Detect that pattern."

Pat Flynn:

Yeah. Okay, got it. So I'm thinking of our dear friend Bob Marks, and he does want to say that there is obviously a non-algorithmic aspect about us. But from what I remember, and apologies to Dr. Marks for not remembering everything he said on this topic, I know he focuses a lot on phenomenal consciousness.

Winston Ewert:

And I think that's definitely where the best case is.

Pat Flynn:

And so you two are in agreement there, to be sure. And again, it's just really just thinking about this cognitional ability where you're saying, "Yeah, no, don't be so quick to dismiss the idea that this really could be algorithmic through and through, however impressive, however sophisticated." All right, so anything else you want to say about that or the halting problem or just in general support of your sympathy towards human cognitive ability being a sophisticated algorithm before you move on to some of the implications?

Winston Ewert:

Yeah, the only thing, I guess what I would say is, for me, if you look at humans' limitations on certain things, it makes sense in my mind that they seem algorithmic. So one of the ones I talk about in the paper is, someone else looks at busy beaver numbers, which is this game programmers play to say, "Given a very short program, how big of a number can I describe?" And so you look at it, and while humans, they've managed to figure out this largest number that you can describe in some very short programs, but then we've actually fizzled out in terms of, once the program size gets large enough, we lose the ability to figure out what the smallest one is because there's so many programs to look through. And to me, well, that looks very much like what you'd expect if we're reaching the limits of our algorithm in terms of what we're able to see there.

Pat Flynn:

Yeah, okay. Awesome. Super fascinating. Thank you for this so far, Dr. Ewert. So what we'll do is we'll pause here for part one now that we have heard at least part of your case. And when we return for part two, we're going to start talking about the implications, what this actually means in the wider scheme concerning the nature of the human person, and also get a little bit into artificial intelligence, everybody's favorite topic these days, when we return. So we'll see all of you then.

Announcer:

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