

Walton, Joan (2024) As Within, So Without: Implications for Research of Federico Faggin's Irreducible. *Paradigm explorer*, 145 (2024/2). pp. 3-7.

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As Within, So Without:

Implications for Research of Federico Faggin's *Irreducible*

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Informed by Federico Faggin's theorising in his recent book Irreducible, the purpose of this essay is to present a case for an expanded science of consciousness, which includes interiority as well as exteriority. An argument is made that this expanded science needs to incorporate approaches to research that have been developed within the humanities, but which to date have not been seen as scientifically acceptable.

Introduction

My aim in this essay is to create a connection between science and other disciplines, by showing how Federico Faggin's most recent research into consciousness can be usefully expanded through learning from research within the humanities. Currently, there is a great divide between what constitutes good research within different subject areas, with the result that there is in academia an extensive compartmentalisation of ideas about the nature of valid knowledge. Given that one of Faggin's central ideas is that reality is a unified whole, it seems somewhat contradictory to have so much differentiation in the methods of investigating it.

in his latest book *Irreducible: Consciousness, Life, Computers, and Human Nature*, Faggin's central contention is that consciousness is a fundamental aspect of reality, and is not merely the by-product of physical processes as normally assumed by science. He perceives the dominant materialist scientific worldview, which focuses primarily on external, observable phenomena, as incomplete, because it neglects the subjective, inner experiences that are central to human existence. Within this scientific paradigm these subjective experiences are regarded as illusory, caused by neuronal firings in the brain, with no real meaning or significance.

Since science as a discipline assumes at a foundational level that reality is material, it comes as something of a challenge to be asked to incorporate subjective experiences into its sphere of attention. In fact, as it currently stands, this is an impossibility, as science relies on methodologies that focus on the external, observable and measurable, generally insisting on findings that are replicable and generalisable. Faggin emphasises that internal experiences are private and unique, and hence not accessible

by such methods. Yet he contends that, if we are to evolve a science of consciousness, it will have to be a science of interiority as well as exteriority of the universe.

In the following sections, I show that research which includes the experience of 'interiority' is already taking place in the humanities. Science has to date largely ignored such research, because it has seen itself, and its associated 'objectivist' methodologies, as at the pinnacle of human knowing. Consequently, it has no need to locate itself within either a historical or interdisciplinary context of other ways of knowing, or other perceptions of reality. Increasingly, though, both the weaknesses and the arrogance of this stance are being revealed, in the process illuminating the detrimental effects on human existence.

Following the hermetic concept of 'as within, so without', it can be argued that the external world will reflect what goes on internally. So if science were to look around the world with humility, it will see that, in ignoring interiority, it is contributing to a disconnect between inner and outer, which has led to the upscaling of the many crises we currently face. I argue here that we urgently need to understand and accept Faggin's persuasive claim for an expanded science. This expanded science needs to learn from other disciplines which have understood the importance of interiority for a long while, and been responsive to the principle of interconnectedness across all academic and professional disciplines. In so doing, we can revisit what we mean by 'science' in ways that can only be of benefit to present and future life on this earth.

Federico Faggin and the 'Irreducibility' of Consciousness

Faggin was the inventor of the microprocessor and a committed materialist

for the first part of his life. However, according to his own narrative, despite being successful, famous, rich, and having a lovely family, he was not happy. His search for the cause of his own unhappiness led to him having an amazing spiritual awakening, which included an overwhelming experience of himself as pure love and light. This transformed him, and set him off on a different kind of enquiry, where he was looking for an explanation of his own experience.

Faggin not only wanted to make sense of his experience, but being a committed scientist, he also wanted it to be explainable in scientific terms. For him, it was important to create a hypothesis that could in principle be disproved, but could potentially provide an explanation for events that to date had not been deemed scientifically credible.

It was important to Faggin that any account of reality allowed for experience of life to be accepted as essentially meaningful, where people could make choices about how to live that life. Over a period of 30+ years, he evolved an understanding of reality, which he differentiated into three different levels.

At foundational level, there is consciousness, which he sees as existing beyond space and time, thus being infinite and eternal. Nothing exists beyond this consciousness, which he calls the 'One', as it is the fundamental unified source from which all existence emerges. He sees Love, Creativity and Free Will as intrinsic to the nature of the 'One', with Love not just an emotional experience, but a profound, universal force that connects all beings.

The second level he describes as informational, seeing this as being quantum fields responsible for living organisms, which are quantum and classical in nature. This level includes the structures and patterns that give form to physical reality. It involves the data and knowledge that describe the physical world and govern its behaviour, such as the laws of physics, mathematical equations, and digital information.

The third level is the external reality, which operates classically, communicating through symbols. This is the tangible, material world that we are familiar with and experience through our senses. It encompasses everything that is observable and measurable in the universe, including matter, energy, space, and time.

Revisiting Research Paradigms

My contention is that Faggin's emerging new theory of reality requires different forms of research to those traditionally seen to be acceptable within science. Classical Newtonian science – the kind of science that informed Faggin's world when manufacturing computers - is founded on a realist ontology, where it is assumed that there is a single identifiable reality that can be observed, studied, measured and manipulated. The universe operates as a giant machine, its movements determined

by laws that were inbuilt into its creation. Within this ontology, the purpose of research is to discover those rules and describe them mathematically, with the aim of being able to predict and control. True creativity – that is, creating something anew that was not already in existence - is not possible.

This ontology leads logically to an epistemology based on the belief in total objectivity. The researcher exists independently of that which s/he researches, with no reason to think about the relationship between the 'knower' and the 'known'.

In turn, this leads to methodology – that is, the principles of inquiry, and how that inquiry should proceed. As the presupposition is that the laws determining the universe are a 'given', the scientific methodology is structured to discover those laws, in order that knowledge can be gained about how the universe will unfold. The procedure that permits this outcome is clearly defined: establish a hypothesis, set up an experiment to test the hypothesis, observe and measure what happens, and – if the hypothesis is confirmed – explain the theory in a way that enables generalisability and predictability.

It is worth emphasising that this approach to research assumes a materialist foundation to reality, with consciousness being a by-product of the brain, dependent on the brain for its existence. It is believed that all of our subjective experiences are a consequence of neurons in the brain, and are not ontologically meaningful. Indeed, there is no ontological meaning to the universe; we are the consequence of a chance event, and at death, we just cease to exist. There is no acceptance of there being a reality that exists beyond the material, and hence no reason to question the research paradigm which has been taught to scientists. Generally, scientists have not had the opportunity to learn about other research paradigms, perhaps not even knowing that they exist. They have not been encouraged to see their own approach to the creation of knowledge within a wider historical, philosophical or social context.

This limitation in the education of scientists is concerning, especially when, within their own ranks, they realise that there are flaws in the materialist worldview they hold. For example, the rigorously researched accounts of near-death and out-of-body experiences demonstrate that the consciousness of an individual can be present separately from their body. This negates the view that consciousness is dependent on the brain for its existence. The question then arises: what is the source and nature of consciousness, and what are the implications of findings that suggest it is present beyond the material world?

One of the implications is that we need to revisit the Newtonian scientific paradigm, and revise not only ontology, but also epistemology and methodology. However, because of their training, and the lack of

contextualisation of their approach to research, scientists often try to make sense of this data within their existing paradigm. Specifically, this means that they continue with a methodology which assumes separation of researcher and researched, aims for 'objective' evidence, and prioritises data that is capable of statistical analysis. Although Faggin is promoting an ontology that assumes subjectivity, his Foundation is, according to his website, funding two projects: firstly, the 'development of a new conceptual framework capable of inspiring'; and in the second phase, 'the creation of a new mathematical theory of consciousness that can make testable predictions'¹.

These observer-independent forms of research undoubtedly result in interesting and relevant findings, and may be necessary and helpful; but are they sufficient?

I would suggest that the answer to this is an emphatic 'no'. Faggin has introduced a radically new worldview; a worldview where Love, Consciousness and Free Will are integral to the very fabric of reality; a worldview where a person's subjective internal worlds are as real as the external physical world; and a worldview where an individual's 'interiority' includes experiences which are not accessible to the external observer. These experiences include 'qualia', which are private and non-cloneable. In understanding the totality of reality, it is as important to understand the nature and significance of inner worlds, as these play a formative role in how the universe unfolds.

This leads on to another distinction between Faggin's view of reality, and the deterministic, mechanistic model held by traditional scientists. In the latter, the universe was created by a chance event, and has no innate purpose. In Faggin's interpretation, the universe is essentially purposeful and meaningful: it is the One seeking to know itself. Moreover, there is at some point a transition from a quantum state (where there are infinite options for knowing of self), to a point where there is a collapse into one definite reality – that which is seen in the external world, and which is a classical physical state. The creation of the universe is far from a chance event; quite the converse, it is teleological in nature. There is (hypothetically) a desired end state where the ultimate 'Ground of Being' is able to purely express itself in material form. Overall, Faggin supports the idea that we are, individually and collectively, involved in an evolution of consciousness, having free will choices as to how that evolution unfolds.

Faggin's ideas are new within classical science, but they are not new in the history of thought. Diverse philosophers and intellectual thinkers, such as Teilhard de Chardin (1881-1955), William James (1842-1910), Alfred North Whitehead (1861-1947), Carl Jung (1875-1961), Owen Barfield (1898-1997), Jean Gebser (1905-1973) and Ervin László (b 1932) are amongst the many who have reflected on consciousness evolving over time

within a non-materialistic context. And indeed, Faggin himself does not claim this is new thinking. In a recent webinar in a conversation with Alex Gómez-Marin, organised by the Pari Centre², he was asked by Pankaj Agrawal whether the wholeness that he experienced and tried to describe in his theory, was the same as spoken about in Eastern philosophies by the yogis, the Vedanta and the Upanishads, where they talk about the experience of Brahman, who wanted to know itself, and from there the whole of creation took place. Faggin acknowledged that he recognised these texts, and that similar accounts were given by Parmenides, Plotinus, Meister Eckhart and many others. He, though, had come to this from his own knowing, his theorising uninfluenced by the thoughts of others, and so he was able to relate his knowledge of physics directly with his experience, without being ‘interrupted’ by the thinking of others.

So there is no claim being made that Faggin’s ontology is new in its essential form. Indeed, it is well established within philosophical and diverse spiritual writings. What is new is that it is being introduced into science, and is being developed in a way that aims to integrate and make sense of both quantum and classical physical interpretations of reality. Faggin’s intention is that the traditional materialistic context within which science has evolved is shattered, and is replaced with this holistic, teleological view of the universe.

However, what I am proposing is that in terms of a research paradigm, it is not possible to change the ontology, without also then changing the epistemology and methodology, as the latter two flow from the former. If the ontology describes a unified reality which has consciousness and free will as integral, and is consciously evolving with inherent meaning and purpose, then there is no such thing as an independent observer.

So when Faggin says his new understanding of reality, which includes our interiority being as significant as our exteriority, requires an expanded science, it is important to address all three elements of the paradigm. To restate what was written earlier, the existing Newtonian scientific paradigm assumes an objective accidental universe with inbuilt laws which can be known through observation and measurement. But when the ontology proposes a foundational unified reality which is seeking to know itself, and we as human beings are participating in that process of self-knowing having experiences that are private and non-clonable, then it does not make sense to talk about objectivity, generalisability and predictability. We need an epistemology that recognises that there is no separation between researcher and researched, and a methodology that includes subjective experience as central. In other words, we need qualitative not quantitative forms of research.

Qualitative Research

Academics in the humanities usually receive a different kind of education in research methodologies. Unlike science, there is no assumption of a specific paradigm, so they learn about the different options. Figure 1 shows three different paradigms, including the positivist paradigm which underpins classical science. There are other paradigms, though, including critical theory, critical realism and pragmatism, each with their own distinct combination of ontology, epistemology and methodology. In doctoral theses, candidates from the humanities generally need to explain which paradigm they are using and why, in recognition that paradigm is a choice, unlike with science doctorates, where the paradigm is taken-for-granted.

There is a growing recognition in various scientific disciplines that there is benefit in introducing qualitative methods to complement quantitative approaches. For example, researchers have conducted in-depth interviews with individuals who have had near-death experiences, inquiring into what they witnessed, the emotions involved, and the personal impact on their lives (e.g. Ahmadi et al. 2022; Charland-Verville et al 2021; Lindseth & Norberg 2020; Greyson 2007).

Though these forms of analysis have crept in to the edges of scientific inquiry, they still remain marginal, and the adherence to the positivist research paradigm, with its

Three Research Paradigms			
Research Paradigm	Ontology (Assumptions and beliefs about the nature of being and existence)	Epistemology (How do we come to know the world? What is the relationship between the knower and the known?)	Methodology (The process of how we seek out new knowledge. The principles of our inquiry, and how inquiry should proceed)
Positivist	Objectivism: Belief in a single external reality, which exists independently of any observation of it.	Total objectivity – Separation of researcher from that which is being researched.	Belief in the scientific method (hypothesis, experiment, observe and measure, explain, predict, generalise.)
Interpretivism	Relativism Reality is subjective. There is no absolute ‘objective’ reality – each of us constructs our own subjective notion of reality.	Subjectivism: All knowledge is subjective in nature. The assumption is that we cannot separate ourselves from what we know. The researcher and focus of research are linked.	Interpretive approaches rely heavily on naturalistic methods (interviewing, observation and analysis of existing texts).
Participatory	There are both subjective and objective dimensions of reality, which are co-created by mind (internal) and the surrounding cosmos (external)	Inter-subjectivity – Knowledge is gained through dialogue and interaction with others.	Engage together in dialogue as co-researchers and co-subjects.

Figure 1: Three Research Paradigms.

emphasis on objectivity and quantifiable outcomes, sustains.

In my view, though, Faggin's model of reality calls out for a different kind of research altogether. Key questions to ask are: What is the purpose of the research? What do we hope to achieve?

Traditionally, the purpose of research is to describe and explain existing phenomena, in the belief that there is an objective 'truth' waiting to be revealed. Consequently, research methods are selected with the aim of discovering that already existing truth.

However, the scenario with Faggin's worldview is virtually the inverse of that view. In presupposing an infinite and eternal Consciousness, with Love as integral, and a belief that consciousness is evolving in responses to freewill choices that we make, should our research not be much more focused on inquiring into what kinds of choices are most effective in realising the teleological intentions of the universe? This means that we need to look at how we **improve** life on this planet, not just describe and explain it. Within new understandings of consciousness, the emphasis arguably needs to be on immersing ourselves fully in our experience of it and continually evaluating whether and how we are realising its innate potential, with that taking precedence over standing back and attempting to gain better third person

theories of it. In this respect, John Heron's (1996) concept of four-fold ways of knowing is useful: we start with our **experience** (our 'interiority'); **presenting** what we experience in the world through creative means such as dance, art and music; making **propositional** sense of what we experience; and finally, apply the learning we have gained in our **practical living**. This becomes a cyclical process, where all 4 elements become integrally interconnected in a cycle of intentionally improving how we live.

If we were to take such a perspective, what might a good research question look like in this context? It would need to be one that enabled us to explore what was possible, and to evaluate together how we can be of service in realising the purpose of existence. One such question might take the form of a collaborative inquiry, asking:

"How can we, individually and collectively, as unique expressions of the One, contribute to a meaningful evolution of consciousness, and in the process, further the ultimate aim of participating in the One coming to know itself?"

Because of the nature of their training, most scientists would most likely say that this may be an interesting question, but it is not scientific. At this point, I revert to Faggin's view that we need an expanded science. In a 2022 webinar, he explicitly says:

"Yes, I see that science will have to be a science of the interiority and the exteriority of the universe. It cannot be just the science of the exteriority. Once you accept that the interiority is not epiphenomenal but exists, is real, in fact more real than the other one that you thought was the only reality, well then, everything changes. And how is it going to go? God knows. I mean, I couldn't even tell what (was going to happen to) the microprocessor after I did the first. I mean, the creativity of people is enormous, so it's impossible to tell the consequences of these things".³

In this interview, Faggin suggests that, given how long it has taken people to understand the implications of quantum physics, it may take 200 years to get to the point where a science of interiority is accepted as valid. I am somewhat more optimistic than this, though. My contention is that, within the humanities in particular, there are many people who have long recognised the importance of engaging in very different forms of research in order to more fully understand what it means to be human. The main challenge, as I see it, is not an intellectual one, but is psychological: that is, how to persuade scientists to enter into the world of the humanities, to learn about their very different approaches to research, and to consider how these approaches might help develop an expanded science. It will mean revisiting ideas of what constitutes valid



knowledge. It will also mean recognising that there are other forms of evidence at least equal in value to those which are quantifiable. Our interior worlds are experiential, and so cannot be described in physical quantities. As Bernardo Kastrop states in the same interview mentioned above:

“I mean, what is the length in centimetres of a thought? What is the weight in grams of an emotion? What is the angular momentum of a fantasy? You can’t do that. But that’s what the world is, in and of itself, because beyond appearance, beyond representation, beyond measurement, what is left is interiority”⁴

What has been Happening in the World of Qualitative Research?

It is impossible to do justice to the sheer scale of work that has been undertaken in qualitative research, not just in the humanities, but also in education and in the social sciences. It is beyond the scope of this paper to detail that work, but instead to indicate the wealth of riches that are available for scientists who truly understand the implications of creating a science of subjective experience.

One of the first questions that is asked by any researcher wanting to produce credible knowledge are issues of validity, reliability and trustworthiness. As far back as 1985, Yvonna Lincoln and Egon Guba, foundational figures in qualitative research, wrote an in-depth book on *Naturalistic Inquiry*. In it, they introduced concepts of credibility, transferability, dependability and confirmability as criteria for trustworthiness, parallel to the conventional criteria of internal validity, external validity, reliability and objectivity. Between 1994 and 2024, Lincoln in collaboration with Norman Denzin have produced six substantive editions of *The Sage Handbook of Qualitative Research*, each one with mainly new content. There are few topics about the subject of research that have not been investigated within these pages, including substantial analyses of the role of scientific knowledge and scientifically-based inquiry.

In addition, the numbers of stand-alone texts exploring the outer reaches of researching what it means to be human have increased over the decades. Particularly significant here is the work of Jeffrey Kripal (2022). In his most recent work, *How to Think Impossibly*, Kripal (2024) starts from the premise that all subjective experiences are a real part of being human, and are revealing a deep shared reality. From this foundation, he interweaves humanistic and scientific ways of knowing to enable us to learn more about our internal worlds. This leads to the integration of experiences which to the pure rationalist might appear impossible, but within a wider conceptual framework of understanding, become possible. Such openness to ‘thinking differently’ is of major significance when exploring at a deeper level what it means to be human.

It is also worth looking at the range of doctoral theses that have emerged out of researchers engaged in some way in exploring the relationship between their subjective selves and their action in the world. Notable examples include students supervised by Professor Jack Whitehead, for many years at the University of Bath, who are influenced by the idea of a ‘living theory’ as they evolve their theories of practice, as they seek to be of service in the world. The title of just three PhD theses provide an example of a form of research that might be seen to resonate with Faggin’s view of the world: Eleanor Lohr, *Love at Work: What is my lived experience of love, and how may I become an instrument of Love’s purpose?*⁵; Jocelyn Jones: *Thinking with Stories of Suffering: towards a living theory of response-ability*⁶; and Jacqui Scholes-Rhodes: *From the Inside Out: Learning to presence my aesthetic and spiritual being through the emergent form of a creative art of inquiry*⁷.

Conclusion

Initially incentivised with the realisation of the ontological significance of quantum physics, and more recently becoming aware of the implications of the possibility of the foundational nature of consciousness, scientists are realising that their approach to research is ill-equipped to respond to these new perspectives. Many, including Faggin, realise that there is an urgent need to develop research methodologies that honour and validate the significance of internal worlds. My call here is not to seek to recreate the wheel. Science does not need to set off on its own on a ‘new’ and lengthy journey. The conversation regarding how to engage in rigorous and systematic research, without being constrained by outdated worldviews, has developed extensively since Lincoln and Guba (1985). The world of qualitative research is buzzing with energy and rich content. In the spirit of dissolving boundaries within an interconnected universe, scientists may gain much from seeking collaboration from those in the humanities, and learning from their experience.

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(Endnotes)

1 www.fagginfoundation.org/about-us/

2 <https://www.youtube.com/watch?v=RYa6OFqPm64>

3 <https://www.youtube.com/watch?v=YRlrf7XzEnA> 1:26:02-1:26:46

4 <https://www.youtube.com/watch?v=YRlrf7XzEnA> 38:23 - 38:43

5 <https://www.actionresearch.net/living/loh.shtml>

6 <https://www.actionresearch.net/living/jocelynjonesphd.shtml>

7 <https://www.actionresearch.net/living/rhodes.shtml>

