Seeing Without Eyes

Climbing up the impossibility ladder with controlled experiments in talented individuals

"*One must cease to look; it is necessary, closing one's eyes, to change this way of seeing by another one and to wake up this faculty that everyone possesses but that very few use.*" — PLOTINUS

Summary (197/200 words)

If minds are nothing but the activity of brains, then the perception of external objects without mediation of the five senses should be impossible. However, if it was shown that humans can see without their physical eyes, such "extra-ocular vision" (EOV) would not only challenge the prevailing materialistic scientific paradigm but actually refute it. Our main hypothesis is that "seeing without eyes" is possible, not just metaphorically but literally. Building upon scattered evidence of the phenomenon across different schools in time, we propose a series of tightly controlled experiments to effectively elicit and rigorously measure EOV in talented individuals, especially blind people. In addition to providing strong empirical evidence, we highlight the importance of theoretical work to give us reasons to believe the data. Anomalous cognition in one framework can become quite normal in another. Framed within a Jamesian theory of brain function —whereby the brain would permit consciousness rather than produce it— our proposal can demonstrate that "you are more than your brain". Ironically, we need to go *beyond* the brain but we must also come back to it, as a privileged organ that can give us clues about the difficult marriage between mind and matter.

Description of the hypothesis (2766/3000 words)

A century ago, in his book "Eyeless Sight", the French poet Jules Romains presented a series of experiments on what he called "extra-retinal vision" (Romains, 1924). Romains' forgotten pioneering work is the basis for our proposal.

He claimed that people can see with their eyes blindfolded and favored the explanation that such ability is mediated by ocelli, "little eyes", that would be found in our skin. Later approaches continued this line of reasoning, proposing that EOV is based on "dermo-optical perception", that is, in essence, seeing with one's fingers. Despite some evidence of it, we and others also have preliminary evidence that it can be bypassed much like bicycle training wheels cease to be necessary at some point in developing a skill. Moreover, discovering such light-sensitive sensors in human skin would be fabulous (they have actually been shown in other animals) but would not necessarily explain how one could perceive complex figures and even letters, nor would it suggest that minds extend beyond brains.

In our understanding, EOV falls within the purview of "extended mind" theories, which argue that minds are not confined to skulls. However, when pressed, most of their proponents consider minds extended in a metaphorical sense, emphasizing the reciprocal interactions between brains, bodies and environments. Here we adopt the "extended mind" hypothesis in its strongest sense: minds can apprehend objects "out there" without the mediation of optic nerves because minds are literally, not just metaphorically, extended.

As you are reading these lines, Romains was writing the appendix of this foundational book a hundred years ago. He had completed his experiments and applied his methods to blind men wounded from the war: "a little before noon, Michel, a blinded solider, who had been with the army at Salonika, recognized the figure 4, which was about eight centimeters high with lines one centimeter thick, placed in a printing frame; and succeeded in following with his finger the outline of the figure through the plate of glass". He adds that "other blinded men recognized figures, colors and objects".

In contrast, Oliver Sacks, in his Foreword to John Hull's *Touching The Rock: An Experience of Blindness* (Hull, 1990), writes: "There has never been, to my knowledge, so minute and fascinating (and frightening) an account of how not only the outer eye, but the "inner eye," gradually vanishes with blindness". In such an "account of blindness as I knew it", Hull makes a shocking distinction between a blind person and "a sighted person who couldn't see". He meant that it takes some time to realize and accept that, having gone blind, one indeed is blind. The scientific proposal that we are articulating here suggests a reversal of such a process and the mirror image of such a distinction: a sighted person might refuse to look and "a blind person may be able to see".

Our hypothesis is thus as simple as perplexing: *seeing without eyes is possible* — it is not trickery, nor mediated by known sensory channels. Such is the scientific adventure that we seek to pursue. Our hypothesis is not post-hoc, namely, we genuinely *do not know* whether it holds. It is a genuine stroll into the unknown.

Note, then, that the very title of our proposal entertains a strong claim by emphasizing how the phenomenon may actually *not* work (seeing *without* eyes). This route of inquiry is called apophatic: knowledge is obtained by negating attributes to the phenomenon under study. However, much like in the "Guess who?" game for children, scientists can arrive at valuable conclusions by eliminating the possibility that the unknown character wears a hat, or has a moustache. One can first approach a phenomenon in terms of what it is not, then continue the inquiry by trying to figure out how it works.

In fact, there are precedents in the literature and, importantly, I have had first-hand contact with people who purport to practice EOV, both very talented children and a blind man (who I will call Vicente). I have seen them with my own eyes doing incredible things without theirs. They all appear credible and are willing, even eager, to help scientists learn more about what is going on with their abilities. This is an unprecedented opportunity, at least for me. Vicente inverts Hull's beautiful remarks: "we have been told that we are physically blind, and that's true, but it does not necessarily mean that we are mentally blind".

Half a century ago, Targ and Puthoff (1974) published in *Nature* "results of experiments suggesting the existence of one or more perceptual modalities through which individuals obtain information about their environment, although this information is *not presented to any know sense*" (*our italics*). In that case, they had provided evidence for remote perception of graphic material and the remote viewing of natural targets. This was arguably the last time that such kind of research was published in a major journal (*Science* and *Nature* are regarded as the most prestigious venues for scientists to publish their findings). The golden gates of the citadel have remained closed since then.

If we zoom out to other phenomena "at the edges of consciousness" (at the "edges" because they are at the cutting-edge of consciousness studies, but also because they have been systematically marginalized), EOV could be considered a sister capacity to "remote viewing" and a cousin of "lucid dreaming". Athletics entails running, whether you are a sprinter or a marathon runner. In the same way, extended non-local perception may take place in different modalities. As in the parable of the blind men and the elephant, by concentrating on different parts of the animal we may argue about it being a tree branch (its legs), a snake (its tail), or a hand fan (its ears). We would all be partially right, but globally wrong, if we can't agree to disagree in order to see the big picture. Science proceeds by enlarging its scope and unifying its purview.

One must also distinguish between two types of research: "proof oriented" and "process oriented". In the first case, one is obviously trying to demonstrate that the phenomenon under investigation *exists*, namely, that there is *really* something worth explaining in the first place. In the second case, one acknowledges the existence of the phenomenon, and the effort consists in figuring out *how* it actually takes place. Here we propose to pursue both paths simultaneously: to test whether EOV takes place by experiments that could reveal that it does not take place at the same time that would inform us as to how it may actually happen.

The experiments proposed here (and detailed below) are motivated by and based on case studies but go beyond simple impressive anecdotes. Under controlled laboratory conditions, we will examine the

capacity of EOV-trained people (*blind* adults!, and also properly blindfolded children) to discriminate between two colors, see a letter T versus a B, describe geometrical shapes, even complex images, or read a paragraph from a book. We will deploy current available methods across scientific disciplines, from physics and neuroscience to phenomenology and AI, also bringing in professional ophthalmologists, illusionists, and philosophers.

One must acknowledge that the idea proposed here is not new. Nor is the empirical testing proposed necessarily based on flashy, technically involved, expensive experiments. We propose creative and tightly controlled experiments that are feasible and that also respect the ecological conditions of the practitioners.

The scientific program we envision is one in which solid empirical methods give rise to validated tests that, in turn, afford independent successful replications. In parallel, the features of the phenomenon will inform the development of a theoretical framework that would guide, and be guided by, subsequent rounds of experiments. A more mature theory would then progressively grant acceptance, making a trans-materialist science more concrete. Scientific paradigms are more likely to change by applying pressure on certain points than by brute impacts — a needle can be more effective than a crane. We believe that EOV is such a needle.

Hypothesis, theory, and experiment are different parts of an entangled whole. Even after having addressed virtually all the caveats conceivable by skeptics (unfolded in detail in the last section), two things may happen: either they ignore the entire research field altogether or enter the slippery slope of fraud accusations. How to go beyond such a flight-or-fight response? When potential major flaws are discarded, the only real impediment to accepting the evidence is usually conceptual. Theoretical work is needed to remove the stamp of “impossibility” from the evidence.

No matter our reverence for experimental work, what will ultimately tip the scales of the issue is whether, in addition to empirical evidence, we have reasons to believe. As the joke goes: “all that

data is very nice, but does it work in theory?". Too often, those who pride themselves as devoted empiricists display the most stubborn philosophical commitments. "Seeing without eyes" can be an anomaly or an impossibility in one framework, while a rather natural occurrence in another. Analogously, "eating with one's hands" may be banned in one culture, while everyday practice in another.

It is important to note that, in the history of science, experiments and theory go hand in hand. In fact, much like Dutch artist M.C. Escher's *Drawing Hands*, theory and experiment draw each another. As Einstein himself put it: "it is the theory which decides what can be observed". Indeed, experiments can knock down entire theoretical edifices, but it is the horizon of a different theoretical framework that spurs those new experiments.

So, it would be scientifically naive to think that rigorous *experiments* is all one needs to make progress in science. We also need a *theory* that would make the results credible, or at least possible. In addition, one would be historically, philosophically, and sociologically naive if one dismissed the need for a *strategy* to persuade scientific colleagues, journal editors, and the media that such findings are worth entertaining.

Science is made by scientists. Recapitulating the history of the PEAR lab at Princeton, Dunne and Jahn (2007) speak of *Scholars Who talk to the Wind*, and mention "pragmatic obstacles" such as "obtaining the requisite financial and administrative support" and "confronting the rejection and ridicule of academic colleagues". This is sad but true. In his chapter on *Matter and Consciousness*, the prominent scholar Iain McGilchrist (2021) writes: "The most contentious area is that of so-called 'paranormal' phenomena, such as extra-sensory perception, telepathy, psycho-kinesis, near-death experiences, remote viewing, presentiment, etc. (…) for the sake of progress of science, as much as anything else, *nothing should be denied fair scientific investigation, and the difficulty seems to be that to accord it such would require years of hard work that very few people can afford, since the price would be exclusion from the 'serious' scientific community*. Those who have genuinely accepted

the challenge with an open mind are worth reading: they do not generally reach the conclusion that it is safe to dismiss the evidence. (…) the danger is that one defines as 'normal' only the things that one happens to believe now: and everything else becomes, by definition, abnormal, para-normal, supernatural, irrational" (*our italics*).

Despite current confusions and confounds, EOV is undoubtedly a very rich theme, completely new to most laypeople (and even psi-researchers). It is excitingly, original, and could lend itself to robust experimental tests, with huge theoretical implications and consequences for everyday life. It could, in short, open the whole question of the extended mind, contribute to normalize both the practice and the investigation of certain psychic phenomena, and provide a more fertile ground for subtle discussions about the relation between brains and minds. EOV is intriguing, fascinating, and fun.

A good experimentalist, like a good journalist, asks questions in a way that we can learn something interesting regardless of the answer. There is never such a thing as a perfect experiment, but a good-enough one that allows us to move forward, rather than moving in circles. We should not confuse "faultless" with "ideal" conditions. We must strive to go beyond doubtful evidential value, without assuming that one single killer experiment would settle the debate once and for all. That's not how science works.

Accordingly, we will try to be cleverly rigorous but not stupidly harsh. One should be careful not to ask for too much too soon. A naive reading of Karl Popper's understanding of falsification (a principle that should allow to tell science from non-science) easily degenerates into a "twitter version" of philosophy of science. Do scientists really try to falsify their own work, or is it always someone else's? Moreover, new hypotheses need confirmatory evidence first, rather than immediate refutation. Indeed, Carl Sagan's mantra emphasizes that "extraordinary claims require extraordinary evidence" (and extraordinary funding, as Avi Loeb remarks). But if we step on a flower every time it attempts to bloom (while refusing to get rid of old rotten trees because they are too heavy), it is disingenuous to proclaim that flowers don't grow.

Walking the fine line between hand-waving believers and flag-waving of debunkers, some experimental results will indeed look "too good to be true". In my preliminary explorations (see below), I gave eight images, one after another, to a blindfolded *blind* man. One of them had a blue car drawn in it (it could have been anything) and, few seconds later, without me saying anything, he said: "it's a car" (the transcription of the entire session is available upon request). I have also witnessed talented kids practicing EOV, doing, amongst other things, a pairing game of three-times-three identically square pieces exactly right, at once, with their eyes blindfolded and the pieces shuffled and *upside down*. Even psi researchers would be tempted to doubt that. So, beyond solid experimental methods, one needs several, independent, and successful replications to cross the understandable resistance threshold of acceptability. Empirical evidence is just the first step to climb the long ladder of impossibility.

Those biologists committed to explore the perceptual worlds of animals tend to downplay our own as humans. Ironically, the converse happens amongst psychologists: those studying human exceptional abilities forget to look at their likely evolutionary roots in other animals. A fruitful avenue of investigation to keep in mind in the context of EOV frames the research in an evolutionary context. For instance, in plants there is evidence of the woody so-called vine *Boquila trigoliolata*'s capacity to "mimic the leaves of its supporting trees in terms of size, shape, color, orientation, petiole length, and/or tip spininess." (Gianoli & Carrasco-Urra, 2014). In insects, *"ocelli"* (literally, little eyes) allow animals to sense light beyond their compound eyes. A recent research article was entitled: "Extraocular Vision in a Brittle Star is Mediated by Chromatophore Movement in Response to Ambient Light" (Summer-Rooney et al., 2020). Thus, rather than a one-off miracle restricted to seven-year-old kids whose parents indulged in a rather strange extra-curricular activity, EOV may be found in other species. Tracing its biological roots and ecological context (for instance, in camouflage) could help us ground its biological origins.

Whatever one believes, it seems pretty obvious that EOV is a subject that deserves further research. Perhaps the electromagnetic field is somehow coupled with the brain in a way we haven't fully understood yet. Maybe that involves a kind of interface at the center of consciousness, beyond the brain. We regard "seeing without eyes" as the analogue of near-death-experiences (NDEs) in clinically dead people. It is just that it has the potential to be trained and tested in everyday life, being witnessed by everyone. Any progress we make in understanding such issues, no matter how small, would be spectacular, not just for EOV (or other related phenomena such as out-of-body experiences during NDEs, for which there is also compelling evidence) but for normal vision as well. We know so much about perception, and yet it remains a mystery.

In a final attempt, Romains prepared a series of sittings "since no one (…) had taken upon himself to re-discover Extra-Retinal Vision, its laws and first applications". He had a long list of professors and clinicians sign the report of a series of experiments. The French philosopher Henri Bergson himself was present in a demonstration arranged at his own house on January 24, 1923. Conclusion: "the tests were completely successful". What a beautiful irony that it is Bergson's theory of perception that we also seek to instaurate here to account for Romains' original discovery.

Romains published his book and "resolved to wait. To wait, why? One thing among others: so that foreign authorities should do my work again and find, by chance or coincidence, what I found". This is precisely our intent a hundred years later.

Relevance of the hypothesis to the call (940/1000 words)

Our proposal seeks to enact a "trans-materialist" neuroscience, where the brain still has an important role to play (of course) but it is not invariably postulated as the omnipotent source of all "natural miracles". The scientific journey ahead is arduous, but great thinkers have started paving the way.

Following the forerunner of experimental psychology William James, the brain may be better conceptualized as having a permissive rather than a productive function (James, 1898). Our theoretical approach embraces the "theory of images" of the French philosopher Henri Bergson who, contemporaneously with James, published Matter and Memory in 1896, a book whose importance for current neuroscience cannot be overstated. James' theory of brains in conjunction with Bergson's theory of perception becomes a sophisticated but simple theoretical framework, coherent and empirically testable. The phenomenon of EOV is one of the most natural corollaries and best demonstrations of such theories.

There are other explanatory frameworks we could draw from. In addition to fascinating quantum analogies recently becoming concrete (Kauffman & Radin, 2023), let us just mention three notable concepts respectively stemming from the study of matter, life, and psyche: David Bohm's "implicate order", Rupert Sheldrake's "morphic fields", and Carl Jung's "collective unconscious". Seeing without eyes is also less of an anomaly within them.

We need to dispel the farse that the only alternative to materialism is a dull version of dualism. The current revival of different ontologies such as idealism (the idea that mind is primary), panpsychism (the idea that consciousness is fundamental in nature), and dual-aspect monism (the idea that the physical and the mental are two aspects of the same underlying reality) can help make EOV respectable, both experientially and philosophically. Moreover, EOV would fit naturally in certain Eastern traditions, such as Chinese, Buddhist, and Indian thought, amongst others.

In fact, “seeing without eyes” sounds like a rather mundane by-product of deep yoga. The great Indian yogi, poet, and philosopher Sri Aurobindo wrote (we quote him at length):

“the subliminal being has also a larger direct contact with the world; it is not confined like the surface Mind to the interpretation of sense-images and sense-vibrations supplemented by the mental and vital intuition and the reason. There is indeed an inner sense in the subliminal nature, *a subtle sense of vision*, hearing, touch, smell and taste; but there are not confined to the creation of images of things belonging to the physical environment (…). It is the subliminal reality and not the outer mind that possesses the powers of telepathy, clairvoyance, *second sight* and other supernormal faculties whose occurrence in the surface consciousness is due to openings or rifts in the wall erected by the outer personality’s unseeing labour of individualisation and interposed between itself and the inner domain of our being. (…) the power of the subliminal to enter into a direct contact of consciousness with other consciousness or with objects, to act without other instrumentation, by an essential sense inherent in its own substance, by a direct *mental vision, by a direct feeling of things* (…) but these capacities are occasional, rudimentary, vague. (…) It is only if we can open up the wall between the outer mind and the inner consciousness to which such phenomena are normal” (Aurobindo, 2001; *our italics*).

The view presented here does not only challenge current philosophical disquisitions about consciousness but also down-to-earth notions of perception that laypeople can understand and even experience: the possibility of literally seeing without eyes! The scope of this proposal is amplified by our first-hand preliminary evidence for EOV. Moreover, to our knowledge, no one else is working on it even within the most knowledgeable parapsychological circles.

Note that this proposal does not require complex concepts, mathematics, or algorithms that only a few experts can really grasp. Nor does it necessitate intricate equipment that only scientists in fancy laboratories blessed with sufficient funding and prestige can afford. Although finding blind people who are willing to participate is not easy, nor is the EOV training program to be taken for granted,

the subjects of study need not be professional psychics either. The talented participants I have come across are rather normal people. Nor would the results depend on statistical quarrels about small but significant effects or averaged probabilistic signals that most people are unable to judge. If the conditions and controls are set right, one would only need to see it in order to believe it.

As mentioned above, EOV can be mapped as one unexplored island in the archipelago of mind (probably connected under the surface) that includes near-death experiences, lucid dreaming, remote vision, and other ways of seeing. They all belong to the edges of every-day consciousness. EOV is arguably more accessible and definitely less explored. Apart from developing it in blind people, it could be easily introduced to school children as part of meditation exercises. Experience and experiment are two sides of the same coin. We propose to start the scientific investigation with a few talented individuals and, as we know more about it, attempt to make the practice and command of those capacities viral.

If successful, this project will open new vistas in the empirical and theoretical scientific study of consciousness. It can reveal human capacities that many traditions have known for millennia, and now contribute to *scientifically* demonstrate them, extending current work on the so-called "extended mind", and providing a fatal chink in the fortress of scientific materialism. This will impact science but also individual people's lives, bringing to society writ large the realization of powers latent in the human mind, accessible to "super-normal" people, thus elevating the moral status of humanity while side-tracking the trans-humanist agenda.

Experimental proposal (5969/6000 words)

To claim that there is a way to literally see the "outside world" with one's mind, and even to restore a blind person's sight, sounds incredible, if not miraculous. But *what if* EOV were not virtually possible but actually feasible?

Antecedents

Despite being lost in time across cultures, hidden behind different names, and guarded as a method to earn a living, there is some evidence that EOV could be real. Such an alleged capacity of the human mind has gone under many different names: extra-ocular vision, the paroptic sense, dermo-optical perception, extra-retinal vision, info-vision, vibra-vision, mind-sight, intuitive vision, etc. At the end of the day, we may be speaking about a form of *clairvoyance* under the umbrella of what is called "anomalous" cognition.

Arguably, the first (and nearly only) book published on the *science* of EOV was written by Jules Romains, as mentioned at the beginning of this essay. It starts with the following note: "No bibliography will be found in the pages which follow. The principal question with which I am dealing is new". Exactly forty years ago, the Mexican neuro-physiologist Jacobo Grinberg reported experimental evidence indicating "that children can see without using their eyes or any other external aids. (…) extra ocular vision follows the same laws of perspective, contrast, acuity, super-imposition and movement as retinal vision" (Grinberg, 1983).

Apart from these pioneering studies in France and Mexico, there are other salient chapters in the history of EOV, such as the case of Rosa Kulsehova in the 1960s, the "Qigong Fever" in China between 1979 and 1999, and other relevant figures such as Lloyd Hopkins, the Bronnikov method, Ken Ring's book on NDEs in the blind, Ivonne Duplessis' studies on the parapsychology of color perception, and recent work by Tània Agorreta and Jordi Imbert in Spain, amongst others (this proposal can't do justice to all of them).

The evidence, however, is fragmented and too often not subject to proper scientific standards. Not supported nor refuted *scientifically*, the possibility of EOV remains, like a disoriented ghost, lurking in the background. Many of the astounding claims have never gone anywhere. There is smoke coming out of many places, but it is hard to tell whether there is also fire.

Given all such antecedents across time and space, why hasn't EOV taken off as a scientific research program?

First there is the use of different names, from different cultures, in different languages. Second, the secrecy, zeal, and expensiveness of certain schools. Third, most of them are not concerned with the scientific validity of "seeing without eyes". Instead, EOV is a stepping stone to improve education, bring more awareness to everyday life, offer psychological help, or navigate life with more confidence.

We are not denying that EOV is scientifically true. Nor are we affirming it. We are entertaining it as a hypothesis to be scientifically tested. Science requires a dispassionate view on things: can we look at EOV and examine it "objectively" while acknowledging our "subjective" beliefs and disbeliefs?

Two major challenges: recruiting *talent* and preventing *trickery*

Many people may have never heard of EOV or even entertained the possibility that one could literally "see without eyes". And only a very few would have tried. Of those, who would dare to claim oneself as being capable of such feats? The fate of social ridicule and professional canceling is waiting for anyone willing to stand up as a practitioner and as a scientist studying the phenomenon. The doors seemed locked both from the inside and the outside.

We must admit upfront the following "elephant in the room": as it turns out, the way EOV is practiced and demonstrated entails a big risk for trickery (self-deception at best, and fraud in the worst-case scenario). As the famous physicist and Nobel Prize winner Richard Feynman remarked, "the first principle is not to fool yourself — and you are the easiest person to fool".

Our main challenge is thus two-fold: we need (i) to find talented individuals who are willing to participate in our research, and then (ii) and engage with them experimentally deploying more stringent and ingenious controls, granting scientific validity without ruining the manifestation of the phenomenon itself.

Why concentrate on a few talented individuals, as opposed to running the tests on large numbers of people that could provide a more convincing statistical result? This obvious example may help: If we were to study differences between swimming styles in young children, we better pick those who can already swim; drowning would not count as a swimming style, nor as proof that swimming is impossible.

The next imperative question is where to find them. A first recommendation is to approach EOV training schools and earn the trust of those coaches and developers willing to collaborate with scientists. This needs to be done with scientific humility and gratitude, but also with rigour and determination; the role of the scientist is not to confirm a given method or increase its market value, but to dispassionately test what is really going on. A second invaluable step is to ask the EOV "experts" to in turn ask their most talented individuals whether they would be willing to participate in scientific "experimentation". Above all, one must cultivate a relationship of trust. Only then can the science begin.

Climbing the "impossibility ladder"

A usual knee-jerk response to the proposal of EOV is this: "it's just trickery". Upon a second iteration, the above response may read: "well, it is *mostly* trickery". If 99.9% is, then identifying and studying the remaining 0.1% can make all the difference. Ten thousand white swans do not negate the possibility that a black swan exists. *If* we found such a creature, then those ten thousand white ones would be irrelevant.

Of course, any claim worth considering about "extra-sensory perception" needs to deal with concerns about "sensory leakage". We must revisit and refine the claims for and against EOV. Let us explore a series of alternative hypotheses, and how to progressively test them.

Is it just peeking?

In a 1966 piece in *Science* magazine, the paradigmatic skeptic Martin Gardner denounced that "recent tests, offered as confirming evidence for DOP [dermo-optical perception; a mechanism proposed for EOV], lack sufficiently tight controls to rule out trickery". After mentioning the notorious case of Rosa Kuleshova, a young Russian woman who "could read print simply by moving a fingerprint over the lines", Gardner insisted that "mentalists who feature eyeless vision do obtain, by trickery, a way of seeing. Many ingenious methods have been decided, but the oldest and simplest (..) is know in the trade as the 'nose peek'". For Robert-Houdin (the great French magician, from whom Houdini took his name), Gardner quotes, the blindfold "was a useless precaution (…) for whatever care may be taken to deprive a person of sight in this way, the projection of the nose always leaves a vacuum sufficient to see clearly." This is the quintessential criticism of EOV: if magicians can peek, all reported individuals could be peeking.

One does not need to deny that cheating can happen more often that one would like to admit. Blindfolds are actually not that great controls to guarantee that no visible light whatsoever is reaching the eyes. They have a performative aspect and probably also a deeper role, reducing visual input to allow for the inner light to manifest. But, in the context of science, blindfolds do the opposite of what they purport to do: they raise concerns rather than dispel them. Even more given that people engaged in EOV (especially kids) touch them and move their face in stage ways. Moreover, anyone using them can tell it is not infrequent that some very little light may sneak in. Whether that light is enough to be able to tell colors, shapes, or even read, that's another question. But the discussion is stuck here.

This is urgent and important. The most obvious and crucial weak point to address before any fruitful research can take off is “peeking”. If, somehow, blindfolded participants use dsome light coming in through tiny gaps in their blindfolds to *see*, then “seeing without eyes” would obviously be compromised. Such a flaw would poison the entire inquiry, *even if* EOV was real.

Instrumentation: back to the future

It sounds as if skeptics would *never* accept any experimental evidence with blinders. What would they be willing to consider?

A century ago Romains used the *Bouclier*, a simple device designed to intercept “every straight line connecting the object and the eyes”. It was basically a box with a top lid where participants would insert their hands to explore objects inside. Given his positive results with it, he claimed that “perception, therefore, really occurs without the assistance of the retina” (70).

One could take it from where Romains left it, complicating the blindfold precautions. One simple idea would be to add more than one blindfold (some schools actually put on three layers). Several companies exist today offering different brands specifically designed for meditation and sleep (*Minfold*) and sports for the visually impaired (*Goalfix*). One could even use small cotton wools taped right on top of the eyes, beneath multiple blinders. One could also apply certain chemical substances used by ophthalmologists to safely totally blur one’s vision, making it even less likely to be able to distinguish objects or shapes.

A more bizarre idea would entail designing a whole helmet that participants would have to wear, making sure that no light at all could pass through its openings, while allowing people to feel relatively comfortable in it. One could further sophisticate the instrumentation, installing small cameras in such a 21st century “blindfold helmet”, to measure eye movements and whether the EOV practice takes place with eyes open or shut across the different stages of the experiment. At the same time, this would allow for measurements of the precise amount of light, if any, sneaking in the

blindfold from the outside, which could then be compared to known physiological and psychophysical thresholds for normal human vision. In addition, one could install subtle sources of light inside the device to interfere with the very dim light that may still be coming from the outside, or to even create EOV virtual reality situations.

These are variants to the obvious control of doing the EOV tests in complete blindness, since the word “complete” is not trivial, given low but non-zero intensity thresholds and extended frequency ranges beyond the usual visible light as part of the electromagnetic spectrum. Light may not be consciously visible, but one could still be perceptually aware of it in some indirect manner. In addition, and regarding light sources (either in the room, inside the blindfolds, or in a special box; see below), we could use monochromatic light to tell whether the participant can pick differences in color when the electromagnetic radiation has the same frequency. We could also use UV fluorescent light to explore other frequency ranges.

A complementary route would consist in designing opaque bags or boxes where objects would be placed for participants to perceive (back to the *Bouclier*). This would, in turn, allow for several improvements in terms of stimulus manipulation. For instance, inside “the stimulus box” one could place a tablet running a custom-made app that would also allow to present visual stimuli (from simple colors and shapes to complex images) at precise illumination intensities. One could then compare the effect of physical versus digital cards, both inside and outside the box. This procedure would also permit to present targets in a randomized manner (exploring subtle differences between pseudo-random and true-random sequences, both pre-programmed or generated live) so that neither the participant nor the experimenter would know what is being shown, ruling out other potential routes of sensory leakage.

Whatever the final configuration, it would be desirable, after having systematically explored all these possibilities, that the blindfolding method becomes homologized, so that experiments carried out by different researchers consistently use the same control conditions. Ideally, the instrumentation could

be affordable enough for scientists (with small and big budgets) and EOV trainers for practice and testing to occur in comparable conditions. Above all, participants need to feel comfortable in it.

Apart from special blindfolds and spectacular helmets, one could also make use of screens and curtains intercepting the light between the objects and the eyes. In further stages of the research, one may even place the participant inside a Faraday cage to shield her from further electromagnetic fields, and even have the objects and experimenters in a different room (see below).

Testing "triple-blind" participants

If we go back to Gardner's critique, he made this interesting remark: "It is impossible, *without injury to his eyes*, to prepare a blindfold that does not permit a tiny aperture, on each side of the nose, thought which light can enter each eye" (*our italics*). In fact, we can follow the skeptics here, and pull forward rather than push against their concerns: why don't we test *a blind person* who claims to be able to see without his physical eyes?

When speaking about blind people, one must make a distinction between "registered" and "clinically" blind. Indeed, some visually impaired people may be declared legally blind, while not being absolutely blind, perhaps being able to perceive very dimly some very salient shades. Even then, testing a blind person with a less than 0.1% of their retinal vision (an ophthalmologist and specialist clinicians would professionally assess each participant), while wearing special blindfolds and upon screens and other controls (as described in detail below) should count as what Gardner is asking for. In other words, our inclusion criteria would be stringent but would not reject those "registered" blind with great losses of vision even if it is not technically zero. Let us bear in mind that the pool of people who are "registered" blind, trained in EOV, willing to participate, and discoverable, is not that large.

Such blind people exist. I have met them, and we are exploring together their abilities. I have had the chance to work with a blind person, who we will call Vicente. He is a forty-nine-year-old male, who was diagnosed at the age of 2 with atrophy of the optic nerve, having then only 20% of sight remaining

on both eyes. He enrolled in the Spanish National Organization for the Blind. After a series of eye diseases, visits to doctors, and special glasses, around seventeen he had to start using a cane. At 22 he had his first guide dog. His vision considerably worsened both laterally, frontally, in depth, and at night. He started seeing in greys. In his twenties and thirties underwent several painful interventions that did not work. At forty-years-of-age he applied to be registered blind, and upon the corresponding medical revision the doctor said there was hardly any stimuli sent form his eyes to the brain. Eight years ago, he was diagnosed with total blindness. Today he has a very dim residual light (an estimate of less than 0.3% in both eyes). He sees no colors. A few years ago, though, he started practicing lucid dreaming consistently, and started to remember some colors, manifesting again in his dreams. He has also been practicing remote vision and extra ocular vision with professional coaches. He is willing and eager to help science understand better the nature of EOV.

The angular point of our research thus becomes literally a "triple-blind" condition: (i) a blind person, (ii) using blindfolds (concretely, *Goalfix Eclipse total blackout eyeshades*, by *Goalfix Sports*, the first endorsed by the International Blind Sports Association, and used in the Paralympics Games and Blind Football World Championships), attempts to see and report the characteristics of objects and images (iii) presented by an experimenter who is also blind about what is being presented.

Is it another sensory modality?

Even if we ruled out the use of retinal vision to grasp information about objects, participants could still be using the sense of touch to tell differences that they would then associate with the objects, perhaps guessing them above chance.

One needs to, of course, control for that. One way to avoid exploiting touch information is to put images and other visual targets inside a glass or plastic containers, so that the surface of contact is standardized. In fact, in a series of spectacular guesses Vicente had made on pairs of cups of different

colors, he himself later realized that the cups had a very minute but consistent imperfection that he unconsciously used to tell the difference. It is easy to fool oneself.

One can solve this issue by striving for virtually identical objects, or alternatively by using a battery of new objects every time whose imperfections could not be capitalized to identify them. A complementary control would be to ask the subject to wear gloves of different materials, blocking tactile tactics and even any minute difference in temperature across colors. Objects could also be cooled down to minimize different possible temperature differences due to their different colors).

Is it dermo-optical perception?

The above considerations on touch bring forth one hypothesis that has been debated in the EOV community: the proposal that the perception of colors and simple shapes would take place by sensory receptors placed in our skin. In other words, participants would be seeing with their fingers. Such receptors have not been found in more than a century since Romains postulated them. And it is still unclear how light receptors at the tip of our fingers could convey subtle intensity differences, color information (in the eye we have three different main receptors for colors), or even allow to read small letters.

There is a considerable amount of research on derma-optical perception, and yet our hypothesis is that the activity of fingers may be necessary at first for some people to connect with the object they are trying to perceive, but it is not with their fingers that they actually acquire the information. The question of the awakening and development of the EOV skill is virtually untapped scientifically. Experienced couches tell that some people start seeing though a small point of light that progressively grows bigger, others seem to open a little screen in their mind, and some people can only do so while being physically in contact with the object. In fact, there are many alleged cases of EOV in children where they do not need to touch the materials at all.

In any case, carrying out experiments in special boxes and with gloves, as detailed above, could rule out dermo-optical perception. In fact, Vicente run a series of discrimination tests blindfolded, with a shield, and with gloves, achieving positive results highly above chance (sometimes close to 90%).

Other potential unconscious sources of sensory leakage?

After all this painful but necessary "tour of caveats", we may still wonder whether some sort of cold reading may be going on, whereby some talented readers acquire information from one's tone of voice, posture, or biassing the conversation in certain directions.

To avoid that mind-reading becomes just ingenious muscle-reading, one should avoid direct contact with the participant. The experimenter should preferably be in another room, and there should be no sensory contact with targets before (to avoid memory tricks), nor during the experiment. In sum, we need to guarantee that seeing does not merge from being blind to one's unconscious communication.

These new conditions add to a long list of recommendations of safeguards to minimize possible frauds" via peeking, experimenters' knowledge of targets, randomization, recording, replacement of objects, event sequence, removing of tactile and other sensory cues, as suggested in (failed) replication efforts (Shiah, 2008).

"Isn't it more like telepathy?"

After ruling out peeping, other sensory modalities, and unconscious betrayal of information, what's left? A more advanced critique against EOV would be the remark that it is probably *telepathy*. Such an accusation would sound like music to the ears of parapsychologists: "it's not a ghost, it's a goblin!". Ruling out telepathy (once all the controls mentioned above are in place) would consist on the experimenter not knowing what images or objects are going to be presented to the participant. This could be achieved with some of the procedures already described above and. In any case, the distinction between *clairvoyance* (minds reading material objects without the intervention of the five senses) or *telepathy* (minds reading other minds, who may be sensing other objects with the

intervention of the five senses) is more operational than ontological, namely, a convenient scaffold to differentiate between processes that may, at the end of the day, be part of the same core phenomenon (Cardeña et al., 2015).

One could then still claim that the participant could anyways know about those images, "just" by peeping into the future once the correct answer is revealed by the experimenter later. Fairies, not just ghosts and goblins, may also exist. In fact, testing the ability of the mind beyond space and time is fascinating. There are indeed protocols to rule out *presentiment* although, again, the critique would still support a "minds beyond brains".

Impossible evidence

As one provides new controls and more evidence for lack of "information exchange via known sensory channels", some critics may grow the list of concerns so inexhaustible and open-ended that, at the end of the day, EOV may appear "refuted in principle" while their claims become "irrefutable in practice". At that point perhaps debunkers hold "the burden of proof", being now responsible for providing evidence to demonstrate the validity of *their* own claims. Skeptics often forget to be skeptical about their own skepticism.

Tasks and tests

So, what will we ask participants to do?

There is wide range of "games" used by EOV trainers and practitioners that could be adapted as scientific tests. Here we will exploit the two ends of a gradient: from simple choices between two alternatives (say, telling an identical blue versus red object) to free descriptions of complex images (such as a picture of a spaghetti dish, a teddy bear, or a sunset in the mountain).

First, binary discriminations are useful because they allow many fast repetitions of the same task, leading to relatively simple estimates of the odds that the participant guessed the correct object for reasons other than chance, that is, above a 50% probability.

Preparing indistinguishable objects such as a set of blue and red plastic cups that the participant hasn't had the opportunity to explore before, and presenting them in pairs a randomized fashion, we could ask them to use EOV to tell us which is the red and which is the blue. Preliminary tests suggest that handling both objects to discriminate between them, rather than one at a time, is more effective.

Intriguingly, some participants report to somewhat feel them right before the moment of touching them, as in "a flash". Moreover, they use other "synaesthetic" strategies like moving the objects, weighting them, and even placing them near different parts of the body, such as the ears or the chest, to apprehend any extra-visual information. One needs to ensure that the objects are of exactly the same shape, weight, stiffness, temperature, etc.

As described above, those objects can be first provided directly by the experimenter, but when the performance of the participant is significantly above chance, one will progressively tighten the conditions by putting shields in between the head and objects, asking the participant to wear gloves, putting the objects inside an opaque bag, and the experimenter moving to another room.

Second, beyond forced choices, a more naturalistic situation consists in presenting complex images. This is an extremely difficult task, because a priori the participant would have no information whatsoever about the nature of those images (they could be anything!) and the expected output can also be anything (not confined to a pre-defined narrow set of possible responses such as "blue or red", "big or small", "animal or landscape").

In my experience, one should not expect participants to describe the complete correct image upfront, at once. Nor to arrive at it in a linear piecemeal fashion, with subsequent approximations. In fact, what ends up happening in those talented individuals who seem to be grasping the information in it,

is a fascinating series of parallel “dives” to concrete aspects of the image, interpreted through their usual sensory modalities, memories, and meanings. Taken in isolation, they seem to be off the mark. Considered together, they are like arrows clearly pointing to the content of the image (full transcriptions of these experiments are available upon request).

As an initial protocol, one could use a series of flashcards with simple drawings (vehicles, animals, food) handed to the participant, one by one, by the experimenter. The participant would need to describe what comes to mind in every case. When the participant succeeds, one could move to more stringent protocols. Inspired by the so-called Ganzfeld experiment and by remote viewing protocols, one would have placed four different cards each in an envelope, pick one at random, and ask the participant to describe it. Next, still blindfolded, one would put it with the other three, and ask the participant to tell which one he saw. Finally, a team of judges would score the description provided against all the cards, assigning the most likely one. In this way, such a complex task could be assessed more objectively from different angles.

One would have to set the duration of each session in advance, as well as the total number of trials, to avoid “optional stopping” that could bias the results. The kind of cards and the images therein should be unknown to the participant, new, and picked at random. Their selection should not be made or known by the experimenter in advance, nor now while the test is being performed. Again, all of these precautions would prevent “cold reading”, namely, information leakage from unconscious sources of communication between the participant and the experimenter.

As a general note, it is important to realize that, like mice in laboratories, humans also get bored at absurd, repetitive, artificial tasks. One must be attentive to mundane matters such as whether the participant is tired, hungry, or thirsty. A brief meditation before each task helps settle into the zone. In my experience, maintaining a playful atmosphere and indulging in spontaneous conversations before and after the sessions helps.

Refining the tasks: testing “whether” together with “how”

Based on the above modalities (simple discrimination and complex image description) we would refine our tests into some further juicy “noetic psycho-physical” tasks:

- Test the effect of light intensity in the ability to tell different colors (light frequencies).
- Test the effect of darkness in EOV in conditions below the threshold of retinal vision. Here, Romains and Grinberg differ in their assessment. “Perception is absent in absolute darkness. It is the more sharp, perched an easy, as the object to be seen in placed in a brighter light (up to the intensive of full sunlight)”, Romains claims. Whereas Grinberg reports that “two trained children [placed in a totally dark basement, where none of four witnesses used in this control could perceived any object] appeared to see the objects with no difficulty whatsoever”.
- Illuminate the room with monochromatic light (using, for instance, a sodium-vapor lamp) to test whether participants can see colors when a normal observer cannot. We would also test colors not normally visible now revealed by an ultra-violet fluorescence lamp, and with an infra red camera, also exploring cold objects or cards from a freezer.
- Color blindness: I have come across that blind people may be “psychically” blind to certain colors but not others while engaging in EOV.
- Use the Stroop test for colors, which examines the ability to inhibit cognitive inference.
- Deploy visual illusions, such as the viral “dress illusion” (which looks yellow or blue depending on the illumination) or the “coke can illusion” (which looks red when there are no red pixels at all).
- Use mirrors (test left-right inversion symmetry), binoculars (close-far resolution) and other lenses to investigate whether there is some overlap between the laws of retinal vision and EOV (some very short-sighted children report to see very well at a distance when removing their glasses and wearing blindfolds during EOV).
- Study the effect of distance, head orientation, and directionality of stimuli during EOV.
- Test “numinous” cards, charged with emotions, or original versus fake replicas of ancient objects.

Depending on the skill and confidence of the participant, some experiments could be very telling:

- Discriminate objects without touching them.
- Describe images without removing them from the envelope or placing them upside down.
- Participants could be asked to touch or describe targets behind their backs or heads (this would avoid the necessity of complex screens).
- If 3D targets are used, such as objects (or cards with images on both sides), can participants see the other side too?
- Does EOV necessarily take place from a particular point of view inside the physical body, or can it be projected out of the body schema? This would also give hints that there is no cheating.

Let us not take errors for granted. We can capitalize on them. At a low level of performance, mistakes are plenty and largely uninformative. At a high level of performance, however, mistakes rare but relevant. In other words, when a participant correctly guesses most of the trials, the instances where misses take place are information bounties. Does the performance decrease for certain colors, shapes, or conceptual categories of images? Does making cheating easier increase hit rates? Do blind people score higher *without* blinders?

The data

Apart from obviously taking note of the sequence and percentage of correct guesses, one would want to analyze the whole performance of each participant too. Systematically collecting audio data would allow to go back and revise what was said at every moment throughout the session, as well as the exact timing of certain events like the duration or lag between stimulus presentation and decision-making. Video data would allow to quantitatively measure (via “computer vision” software, the latest instalments of which use deep neural networks) the precise finger movements while scanning objects,

or other potentially revealing aspects of the embodied behavior of the participant such as head orientation and body movements.

Thus, all experiments should be recorded, and such unedited audiovisual material (and verbatim transcriptions of the sessions) included as supplementary material when reporting the scientific findings of the project. Pre-registering the experiments would increase the credibility of the results, since one would avoid accusations of "the file drawer effect" (what did not work was not published, only what worked) or "ad-hoc post-hoc" explanations (making up reasons after the fact).

Such a transparency in the experimental process and data products would also contribute to making "the impossible as convincing as possible". Recordings would be done using multiple cameras, showing close-up views of the experiment, and side and wide range perspectives. Moreover, in the era of AI-generated deep-fakes, multiple cameras synchronized with other measurement devices should decrease the suspicion that "it is all made up".

Indeed, videotaped demonstrations do not have the same value as a mathematical demonstration. The latter compels, the former persuades. So, another way to provide a more direct encounter with the phenomenon would be to carry out scientific experiments as live performances with witnesses. It is well-known, however, that "performance anxiety" can easily ruin one's talents when forced to display them on demand in front of a large judging audience (it is a fallacy to claim that erections are impossible because they don't happen at will in a room full of people). One could set up double-mirrors as in interrogation setups to decrease the feeling that someone is present in the room during the activity, but this is cumbersome and expensive. A way around it could be to use Zoom technology to live-stream events, without the participant knowing whether the camera is on or off. Apart from having a professional committee of witnesses evaluating the credibility of the entire process, the streaming could be announced in social media to increase engagement of laypeople, thus increasing the scope of the project.

Other ways of making this research viral would consist in bringing in professional film directors. As much as one may be inspired or annoyed by certain documentaries, the performative aspect is not necessarily at odds with concerns about the scientific validity of the material. Science is a process, not just a product. We are storytelling creatures. Inviting professional illusionists to recorded demonstrations and harnessing their expert opinions could make the evidence more credible. Entertaining the idea that "the mind is more than the brain" could go viral.

A whole research program

We have described a series of experiments that get progressively more complicated. This is just the beginning of a whole future research program that would integrate behavioral evidence with cutting-edge biological and neuroscientific data, and more. Let us give a glimpse of it:

First, we could couple the tests described above with online precise quantitative measurements of embodied variables such as heart activity (ECG), skin conductance and electrodermal activity.

Second, it would be an irony (and a tragedy) if, while trying to prove that the mind goes *beyond* the brain, we forgot to come *back* to the brain to investigate the role it plays in EOV. As it turns out, humans still need their brains to move their hands and their tongues to express their beyond-the-brain accomplishments. What is going on in the visual cortex? Is there a high coherence between both brain hemispheres when EOV is activated? What is the frequency and the type of global brain waves observed in such states? Is there some kind of "psi-nesthesia", the psychic perception of one extra-sensory channel via another sense? For instance, Vicente felt he could hear the noise of some drawings, and sense the humidity of the picture's landscape, or smell food that would bring him nice memories. It seems that during EOV one climbs up the river of perception and then expresses such pure waters at the top via different river streams reaching the oceans of matter.

We would certainly learn vital information about the mind-matter interface via EEG and fMRI measurements. We could then compare such neural patterns while seeing during dreaming or while

imagining with one's eyes closed. We could also relate EOV with the neurophysiological discovery of blindsight, and explore whether other sensory regions of the brain compensate for cortical processing. Neuroscientists, neurologists, and psychiatrists would certainly be involved.

We could also make use of AI techniques that recently allowed to reconstruct with high fidelity the images a person sees based on their brain activity. It is not science fiction to imagine an empirical situation where an AI is reading brain scans and re-picturing the images a participant is seeing while using EOV to describe a complex image.

Back to physics, we could also study the putative coupling of the electromagnetic field with such processes, and even use random-event-generators based on quantum tunnelling effects to detect anomalies in space-time (deviations from true randomness) when people are engaged in EOV.

Mystics and meditations could also offer great phenomenological insights into EOV. They should be invited in the lab too. How is it like to be blind? And blindfolded? What is the role of intention? Can trained meditators access EOV more easily? What is the role of the experimenter's beliefs in the overall results? We could scientifically compile such experiences with care, growing an empirical record of the natural history of the phenomenon of seeing. And then do surveys, detecting correlations between EOV and other abilities, such as lucid dreaming.

Finally, any true scientific explorer of consciousness cannot remain on the objective side of the fence. We must also attempt to see what our subjects of study see. After all, we don't see with our eyes or our brains, but with our minds.

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References

Aurobindo, Sri. (2001). The Life Divine. Sri Aurobindo Ashram Publications.

Bergson, H. (1896). Matter and Memory. Dover Publications, Mineola, New York.

Cardeña, E., Palmer, J. & Marcusson-Clavertz, D. (2015). Parapsychology: A handbook for the 21st century. McFarland & Company.

Dunne, B. J. & Jahn R. G. (2007). Consciousness, information, and living systems. *Explore* 3(3): 235-243.

Gardner, M. (1966). Dermo-optical perception: a peek down the nose. *Science* 151:654-657.

Gianoli, E. & Carrasco-Urra, F. (2014). Leaf mimicry in a climbing plant protects against herbivory. *Current Biology* 24(9), 984-987.

Grinberg, J. (1983). Extraocular vision. *Psychoenergetics* 5: 141-158.

Hull, J. M. (1990). Touching the Rock: An experience of blindness. Vintage Books.

James, W. (1898). Human immortality: Two supposed objections to the doctrine. Boston and New York: Houghton, Mifflin and Company.

Kauffman, S.A. & Radin, D. (2023). Quantum aspects of the brain-min relationship: A hypothesis with supporting evidence. *Biosystems* 223, 104820.

McGilchrist, I. (2021) The Matter with Things: Our brains, our delusions, and the unmaking of the world. Perspectiva.

Romains, J. (1924). Eyeless Sight: A study of extra-retinal vision and the paroptic sense. Putnam's Sons.

Summer-Rooney, L., Kirwan, J. D., Lowe, E. & Ullrich-Lüter, E. (2020). Extraocular vision in a brittle star. *Current Biology* 30, 319-327.

Shiah, Y. (2008). The finger-reading effect with children: two unsuccessful replications. *The Journal of Parapsychology* 72:109-132.

Targ, R. & Puthoff, H. (1974). Information transmission under conditions of sensory shielding. *Nature* 251: 602-607.