HOW ENACTIVISM RELATES TO REFLEXIVE MONISM

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MIND-BODY THEORIES

Monism is the view that the universe, at the deepest level of analysis, is one thing, or composed of one fundamental kind of stuff. This is usually contrasted with Substance Dualism, the view found, for example in the writings of Plato and Descartes that, fundamentally, the universe is composed of two kinds of stuff, physical stuff and the stuff of soul, mind or consciousness. There are three basic ways in which the apparent differences between physical and mental "stuff" can be understood in monist terms:

1. Mind might be nothing more than a particular aspect or arrangement of physical matter (physicalism; functionalism). Enactivism is an extended form of functionalism (but comes in somewhat different versions, e.g. Noe vs. Thomson)

2. Physical matter might be nothing more than a particular aspect or arrangement of mind (idealism).

3. Mind and physical matter might be aspects or arrangements of something more fundamental that is in itself neither mental nor physical (neutral monism; dual-aspect theory). Reflexive monism is a form of dual-aspect theory (Spinoza)

GROUNDS FOR COMPARING EN AND RM

- What do EN and RM say about perception?
- What do EN and RM say about the hard problems of consciousness?

Hard (conceptual) problems

1. What is consciousness?
2. How does consciousness relate to brain processing?
3. How does one make sense of first- versus third-person accounts of the mind's operations?
4. How can one make sense of the causal interactions of consciousness and brain?
5. What is the function of consciousness?

WHAT IS ENACTIVISM?

The name “the enactive approach” and the associated concept of *enaction* were introduced into cognitive science by Varela, Thompson, and Rosch (1991). It is basically a theory about how organisms function in the world.

Thomson’s (2006) summary: Cognition is a form of embodied action. Cognitive structures and processes emerge from recurrent sensorimotor patterns of perception and action.

This provides the basis for a dynamic sensory-motor approach to the mind-body problem

HOW EN TRIES TO CLOSE THE MIND/BODY GAP

"Rather than looking to the intrinsic properties of neural activity in order to explain experience, this approach looks to the dynamic sensorimotor relations among neural activity, the body, and the world. The concept that has dual currency for this approach is the concept of dynamic sensorimotor activity. On the mental side, perceptual experiences are explicated as ways of acting, constituted in part by the perceiver's implicit and practical knowledge or skillful mastery of the relation between sensory experience and movement (O'Regan and Noe 2001a; Noe 2004). The senses have different characteristic patterns of sensorimotor dependence, and perceivers have an implicit, skillful mastery of these differences. On the brain side, neural states are described not at the level of their intrinsic neurophysiological properties or as neural correlates of mental states, but rather in terms of how they participate in dynamic sensorimotor patterns involving the whole active organism (Hurley and Noe 2003)." (Thomson, 2006)

- Perceptual experiences are ways of acting, constituted by sensorimotor knowledge
- The senses have different characteristic patterns of sensorimotor dependence.
- Neurophysiological properties of the neural correlates of consciousness are less relevant to consciousness than how neural states participate in dynamic sensorimotor patterns

THE RELATIVE VS THE ABS0LUTE GAP

"The dynamic sensorimotor approach is best understood not as an attempt to close the explanatory gap in a reductionist sense, but instead as an attempt to bridge the gap by deploying new theoretical resources for understanding perceptual experience and neural processes in a coherent and overarching dynamic sensorimotor framework. For each modality of perceptual experience – seeing, hearing, touching, and so on – there is a corresponding pattern of sensorimotor interdependence that is constitutive of that modality." (Thomson 2006)

"Hurley and Noe (2003) address the comparative gap, not the absolute gap. They admit that to use a dynamic sensorimotor account to bridge the comparative gap is not to bridge the absolute gap of why there is experience at all. Their aim is to explain why the agent has experience like this rather than like that, but not to explain why there is something it is like to be the agent at all. On the contrary, their account presupposes consciousness and subjectivity, because it starts from the assumption that there is something it is like to be the agent in the first place." (Ibid)

"O'Regan, Noe, and Myin, however, argue that the sensorimotor approach is also able to bridge the absolute gap (O'Regan and Noe 200 1a,b; Myin and O'Regan 2002; O'Regan, Myin and Noe (2006)" (Ibid)

THREE QUESTIONS ABOUT EN

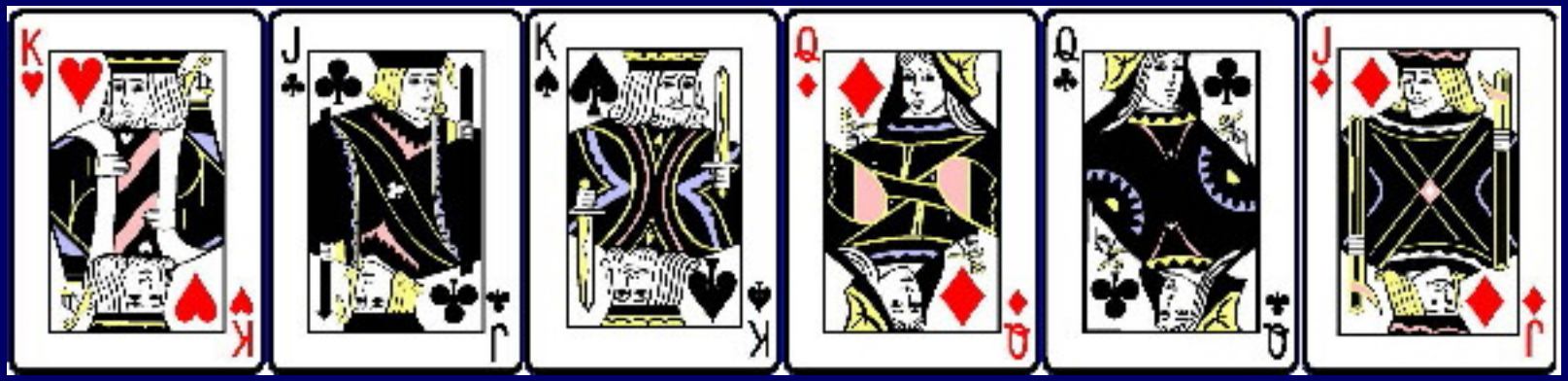
- What does it tell us about perception and cognition?
- Does it close the relative gap (e.g. the differences between what something sounds like or looks like?
- Does it close the absolute gap (why anything should look like anything at all)?

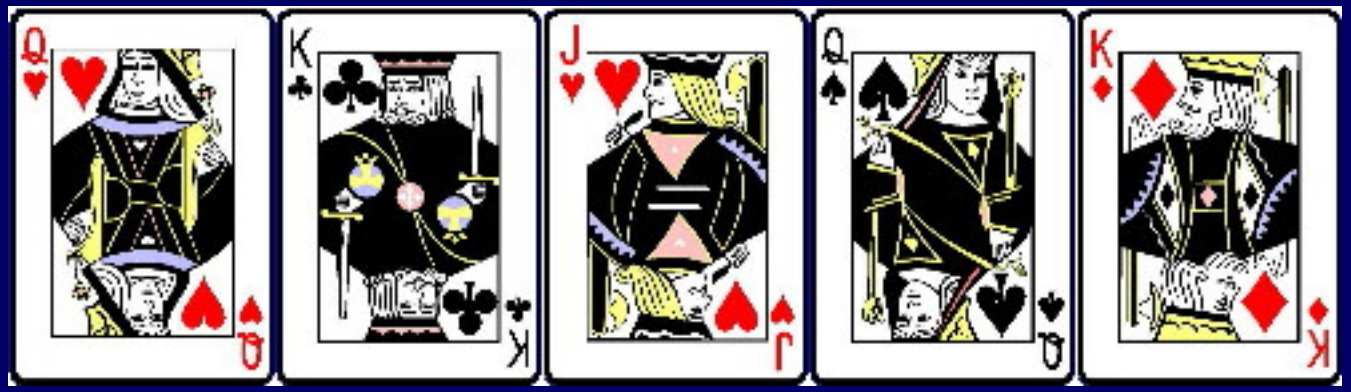
IN WHAT WAY DOES VISUAL PERCEPTION INVOLVE ONGOING SENSORY-MOTOR EXPLORATION?

A standard view: It is common in psychology to assume that we have a detailed, inner representation of the external world built up over successive eye saccades out of the degraded information arriving at the retinas.

The enactive view argues that we do not have a detailed inner picture of the world. Rather we visually explore the world with our eyes rather like we do with the sense of touch, and pick up information as we need it, in a process of active engagement.

Experimental evidence: inattentional and change blindness





WHAT DOES THIS DEMONSTRATE?

Studies of change blindness indicate that we do not notice major changes in what we are gazing at unless we happen to be focusing on the features that change (e.g. Simons and Levin, 1998, asking directions with moving door experiment).

This challenges the view that we have a rich, detailed inner representation of the entire visual world (which we update moment by moment) against which we make comparisons

THE ENACTIVE VIEW

We perceive 5 to 6 features of the world at any given moment (wherever we gaze) but we are free to pick up any other features as we need them by exploring the world (e.g with eye movements). Consequently wherever we look we see rich detail. The reason that we think that the visual world is rich in detail is because the world itself does have this detail. We do not need to build up a detailed inner representation of the world because the world itself stores all the relevant information.

Perception is a form of sensory-motor activity

Note that this is not entirely new

- Piaget
- Distorting lenses experiments
- The Ames room (transactionalist functionalism)
- Miller & Johnson-Laird (1976) *Language and Perception* (procedural semantics)

A quick conclusion: a sensorimotor account of perceptual/cognitive functioning looks useful for aspects of perception and cognition that have a sensorimotor component, i.e. where veridical perception requires motor exploration of the world.

DIFFICULT CASES FOR EN

Any aspect of perception or cognition that does not have an obvious motor component.

1. The colour red versus the colour green
2. The taste of chocolate versus the taste of mint.
3. The smell of coffee versus the smell of ripe cheese.
4. The understanding that $e^{i\pi} = -1$

   "some mathematical findings are not based on empirical measurement ... The transcendental numbers e, and π for example do not have an exact value that can be calculated (no matter how many decimal places one uses), while i (the square root of -1) is an "imaginary" number. Given this, the finding that $e^{i\pi} = -1$, is quite extraordinary, as 1 is the most mundane number that one can imagine!" (Dodwell, 2000)

DOES EN BRIDGE THE RELATIVE GAP?

There are interesting functional differences between vision, hearing and tactile exploration. But do the blind that use sound (echolocation) and touch rather than vision to navigate the world thereby see (at least to some extent)?

The best evidence comes from cases where the blind have vision restored (e.g. by the removal of cataracts). Previously they literally used touch as their way of 'seeing' and exploring objects. Now they actually see them.

Von Senden (1932) in a review of such cases reports that such people may at first find it impossible to identify even simple shapes like triangles and squares by sight alone, although by touch they identify these with ease. Visual identification may also be very difficult to learn. One patient was trained to discriminate a triangle from a square over a period of 13 days but could still not "report their form without counting corners one after the other."

In short such patients have to *re-cognise* the world in a visual way; visual recognition is not just mastery of a sensory-motor skill. Conversely, tactile sensory-motor exploration is not "seeing".

DOES EN BRIDGE THE ABSOLUTE GAP?

- O'Regan, Myin and Noe (in press?) ask, "What is it exactly about phenomenal consciousness which makes it seem inaccessible to normal scientific inquiry? What is so special about "feel"?" Their reply is that "Feel is...not "generated" by a neural mechanism at all, rather, it is exercising what the neural mechanism *allows the organism to do*." The feel of driving a Porsche for example does not reside in any given moment, but rather in the fact that you are currently engaged in exercising the Porsche driving skill. And, "If the feel of Porsche driving is constituted by exercising a skill, perhaps the feel of red, the sound of a bell, the smell of a rose also correspond to skills being exercised."

- Note: this reductive identification of conscious "feel" with the exercising of a sensory-motor skill is a variant of functionalism, although it locates the relevant functioning in the skilful interaction of organisms with the surrounding world rather than in causal relationships that are exclusively located within the brain.

EN DOES NOT FILL THE ABSOLUTE GAP

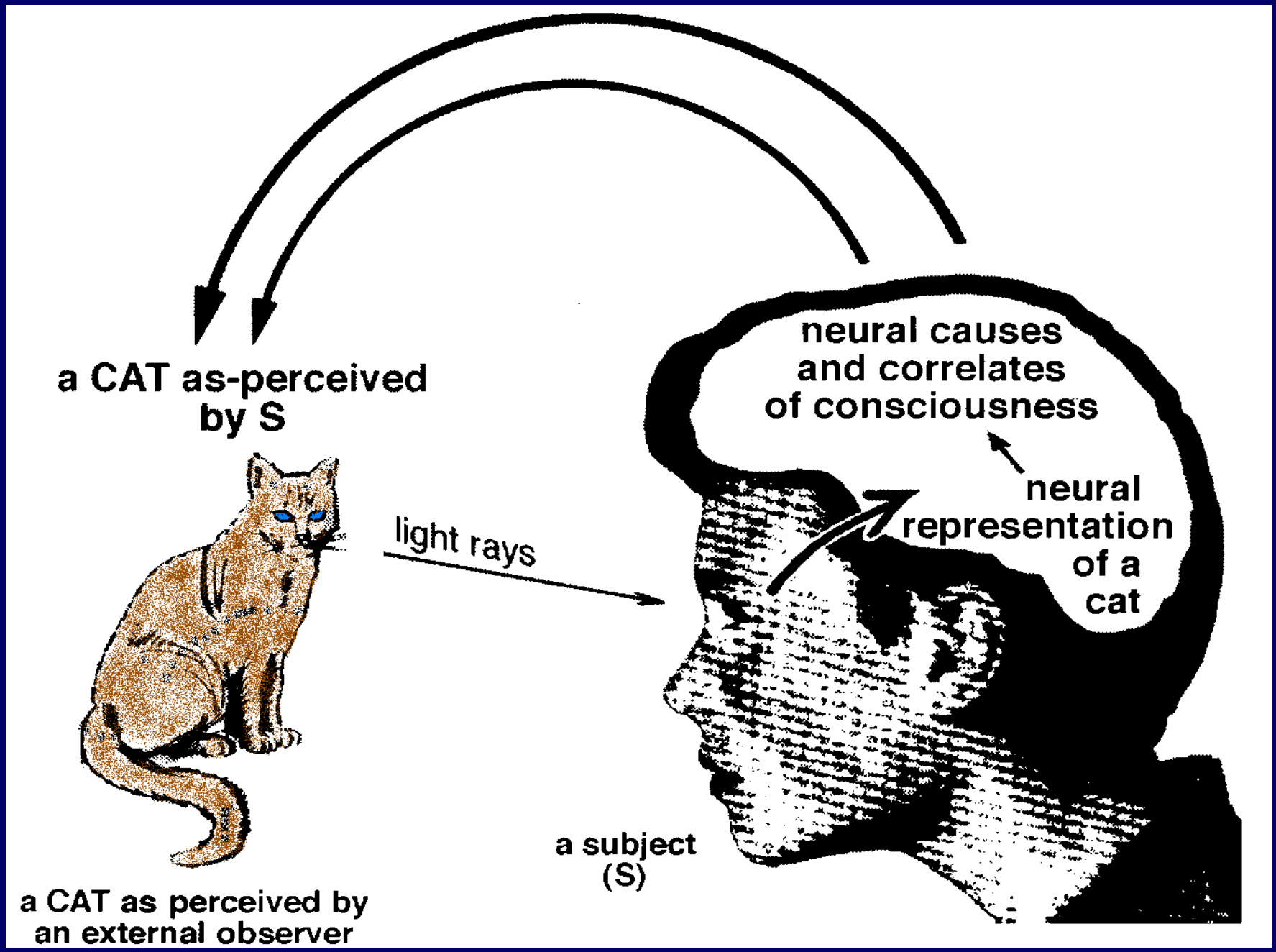
"Why should driving a Porsche or any other skill *feel like anything at all*? I am not denying that functioning of different kinds in humans often feels like something for humans. However human functioning can often be dissociated from its normal feel. For example, once they are well learnt, consciously performed skills can often be performed unconsciously, so it does not follow that skilful functioning itself *explains* the accompanying feel.

If it is a *contingent*, not a *necessary* fact that certain kinds of functioning in humans have certain kinds of feel, then switching one's emphasis away from neural mechanisms as such, to "what neural systems allow an organism to do" gets one no closer to understanding why that enabling of skill should have a feel at all. Piloting a 747 no doubt, feels like something, to *a human pilot* and the way that it feels is likely to have something to do with human biology. But why should it feel the same way to an electronic autopilot that replaces the skills exercised by a human being? Or why should it feel like anything to be the control system of a guided missile system? Anyone versed in the construction of electronic control systems knows that if one builds a system in the right way, it will function just as it is intended to do, *whether it feels like anything to be that system or not*. If so, functioning in an electronic (or any other) system is logically tangential to whether it is like anything to be that system, leaving the hard problem of why it happens to feel a certain way in humans untouched." (Velmans, 2007)

WHAT IS REFLEXIVE MONISM?

Reflexive Monism is a dual-aspect theory (in the tradition of Spinoza) which argues that the one basic stuff of which the universe is composed has the potential to manifest both physically and as conscious experience. In its evolution from some primal undifferentiated state, the universe differentiates into distinguishable physical entities, at least some of which have the potential for conscious experience, such as human beings. While remaining embedded within and dependent on the surrounding universe and composed of the same fundamental stuff, each human, equipped with perceptual and cognitive systems has an individual perspective on, or view of, both the rest of the universe and him or her self. In this sense, each human participates in a process whereby the universe differentiates into parts and becomes conscious in manifold ways of itself, making the entire process reflexive.

This is basically a theory about how conscious experience relates to the brain, body and embedding universe. In microcosm, this is exemplified by the Reflexive Model of perception.


a CAT as-perceived by S
neural causes and correlates of consciousness
neural representation of a cat
light rays
a CAT as perceived by an external observer
a subject (S)

WHAT ENACTIVISM AND RM SHARE

They both oppose

1. Dualism
2. The view that conscious experiences are nothing more than states or functions of the brain.

They both agree that

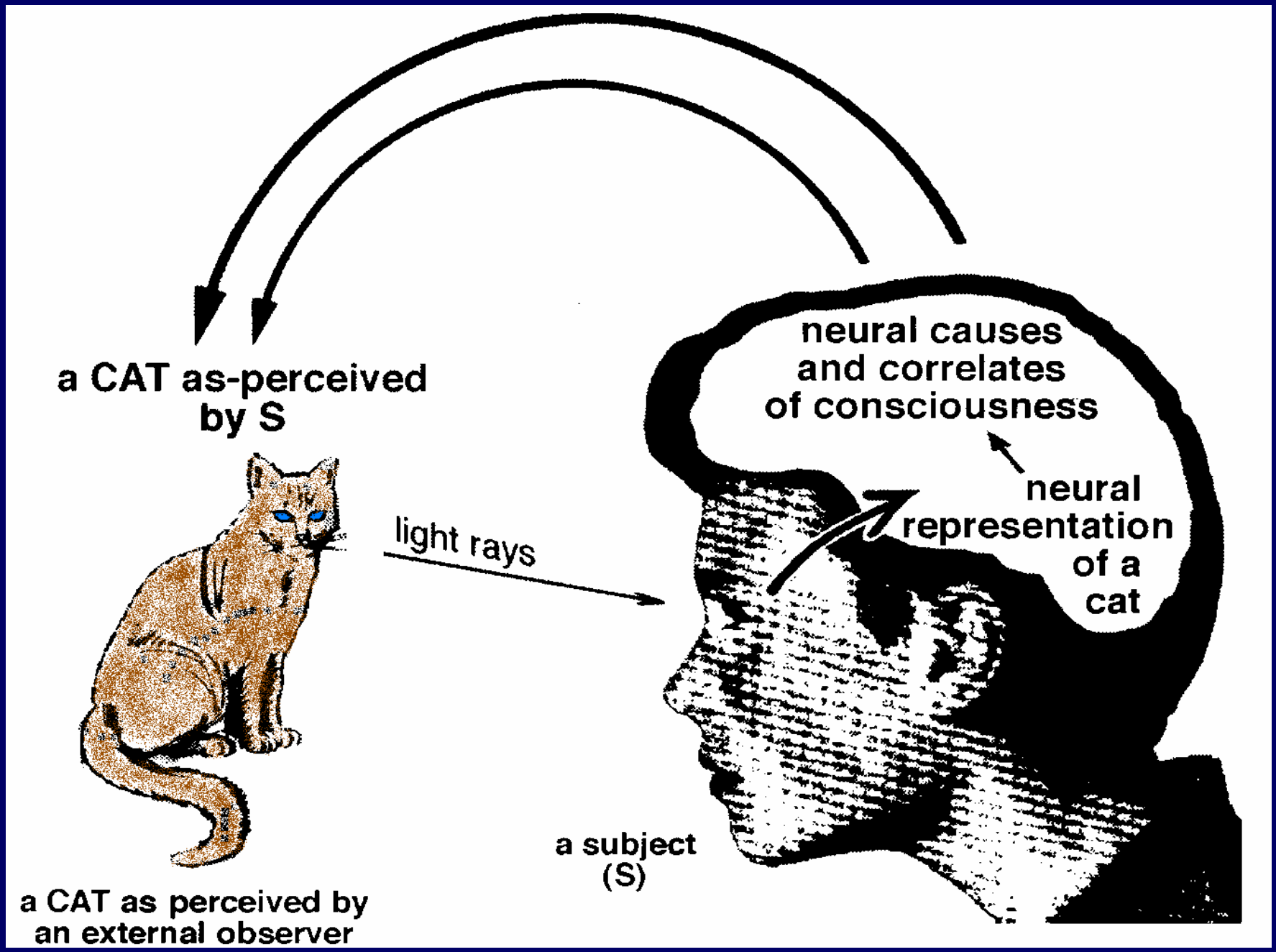
1. Mind and conscious experience are not entirely “in the brain” – and they are in that sense externalist.
2. Interactions between the brain, body and surrounding world have an important role to play in cognition.

HOW EN AND RM DIFFER

EN and RM develop their understanding of consciousness from very different initial commitments.

- EN starts with a theory of how organisms function (Varela, Thomson), then elaborates this into a sensorimotor theory of how perception and cognition operate (O'Regan, Noe, Myin)– and then tries to bridge the mind/body gap by reworking both sides of the gap in an enactive way.

- RM starts with a more accurate phenomenology of conscious experience. Conscious phenomenology does not need to be reduced or reworked to anything other than how it seems in order to be understood.
- First- and third-person accounts of mind are complementary and mutually irreducible. A complete account of mind requires both.
- These accounts can be related to each other through a dual-aspect theory of information.
- Experiences really are (roughly) how they seem.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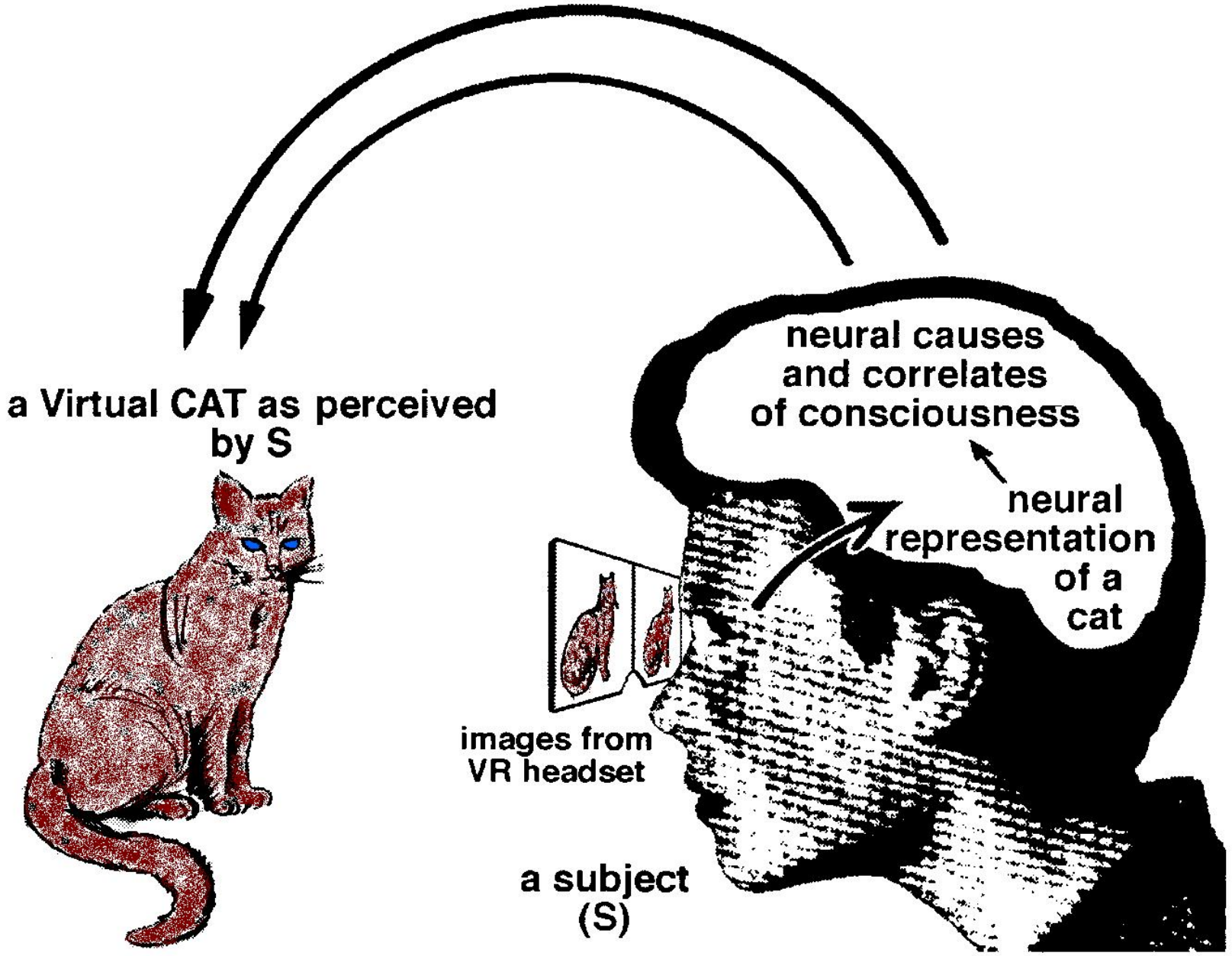
PERCEPTUAL PROJECTION

- Nonconscious processes within the brain produce consciously experienced events which may be subjectively located and extended in the phenomenal space beyond the brain.

- Perceptual projection is an empirically observable effect. It is not a theory about what is going on.

- This effect is subjective, psychological and viewable only from a first-person perspective. Nothing physical is projected from the brain.

  Note that a psychological effect is neither metaphorical or mystical: there are many ways that the operation of perception projection can be studied scientifically. For example there is a large experimental literature about the information that is used by the brain to model distance and location, and about the ways in which such modelling processes break down. There are also many ways to demonstrate perceptual projection in action, for example in hallucinations, phantom limbs, stereoscopic pictures, holograms, and virtual realities.


a Virtual CAT as perceived by S
neural causes and correlates of consciousness
neural representation of a cat
images from VR headset
a subject (S)

WHERE ARE EXPERIENCES?

Experiences are roughly where they seem to be

"...the reflexive model's *externalism* applies to the *phenomenology* of some experiences. Unlike the externalism of enactive theory, which applies to the antecedent causes or vehicles of given experiences, the central claim of the reflexive model is that insofar as experiences are anywhere, *they are roughly where they seem to be*. For example, a pain in the foot really is in the foot, and this perceived print on this page really is out here on this page. Nor is a pain in the foot accompanied by some *additional* experience *of* pain in the brain, or is this perceived print accompanied by some additional experience *of* print in the brain. In terms of phenomenology, this perceived print, and my experience *of* this print are *one and the same*. Note, however, that the reflexive model is not externalist (for any doctrinal reason) about all experiences. Whether an experience is located in external phenomenal space, on the body surface, or nowhere, is an empirical matter that is entirely dependent on its phenomenology." (Velmans 2007)

ISN'T THIS DOUBLY CONFUSED?

1. Doesn't this confuse experiences of objects with the objects themselves?
2. Doesn't this confuse where experiences seem to be with where they really are?

No. When the subject looks at the cat itself, it is a phenomenal cat located and extended in space that they see. In everyday life we regard the phenomenal cat as the "physical cat" but it is only a visual representation of the cat itself.

To understand how the seeming location of the cat relates to its real location one has to understand how phenomenal space relates to measured space

- See Velmans (2008) Reflexive Monism. JCS, 15 (2), 5-50 (online)

HOW PHENOMENAL SPACE RELATES TO MEASURED SPACE

What we normally think of as “space” refers, at least in the initial instance, to the phenomenal space that we experience through which we appear to move. Our intuitive understanding of spatial location and extension, for example, derives in the first instance from the way objects and events appear to be arranged relative to each other in phenomenal space (closer, further, behind, in front, left, right, bigger, smaller and so on).

We are also accustomed to making size and distance estimates based on such appearances. This print for example appears to be out here in front of my face, and THIS PRINT appears to be bigger than this print. However, we recognise that these ordinal judgments are only rough and ready ones, so when we wish to establish “real” location, distance, size or some other spatial attribute, we usually resort to some form of measurement that quantifies the dimensions of interest using an arbitrary but agreed metric (feet, metres etc), relative to some agreed frame of reference (for example a Euclidian frame of reference with an agreed zero point from which measurement begins).

HOW PHENOMENAL SPACE RELATES TO MEASURED SPACE

The correspondence or lack of correspondence between phenomenal space and measured space is assessed in the same way, by comparing distance judgments with distance measurements in psychology experiments.

Such comparisons allow one to give a broad specification of how well phenomenal space corresponds to or maps onto measured space. ... According to the reflexive model, phenomenal space provides a natural representation, shaped by evolution, of the distance and location of objects viewed from the perspective of the embodied observer, which models real distance and location quite well at close distances, where accuracy is important for effective interaction with the world. ... However, phenomenal appearances and our consequent distance judgments quickly lose accuracy as distances increase. For example, the dome of the night sky provides the outer boundary of the phenomenal world, but gives a completely misleading representation of distances in stellar space.

SOME INITIAL CONCLUSIONS

- Although we think of the everyday objects we see as being “physical” they are only phenomenal representations of objects themselves.

- Although we think of the space we see around us as “physical space” it is only a phenomenal representation of measured space or other representations of space given by physics (4D space-time, 11 D space in string theory etc.)

In sum, what we normally think of as the “physical world” is just a phenomenal world (that roughly models the world described by physics)

Why this matters

1. The phenomenal world is part of conscious experience not apart from it.

2. In this sense there never was a gap between the contents of consciousness and what we normally think of as “physical.”

IN A REFLEXIVE UNIVERSE

- Brain processes interact with external physical processes to produce observed phenomena - including the phenomenal 3D world that we normally think of as the “physical world.”

- Consequently, the boundary between what one normally thinks of as "physical" and "conscious experience" has to be redrawn in a different way. Far from there being a separation, the phenomenal world (including all external, observed phenomena) is part of conscious experience.

This has many consequences for the hard problems of consciousness

COMPLEMENTARY FIRST- AND THIRD-PERSON ACCOUNTS OF MIND

- Because we live in different bodies, we have a view of the world (including ourselves) from an individual perspective. This view, resulting from preconscious interactions of the world, body and mind is the phenomenal world (the reflexive model of perception).

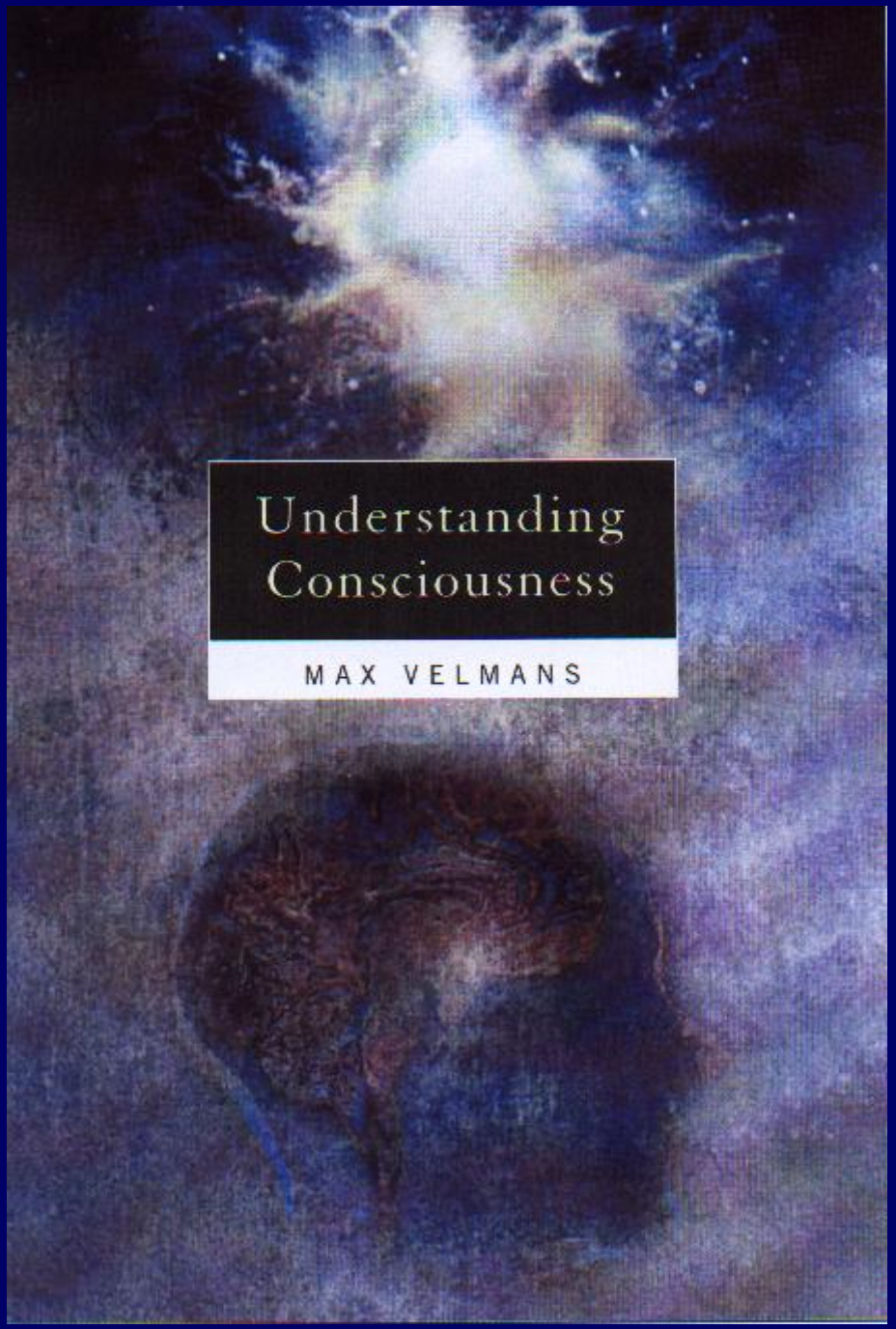
- The details of our phenomenal world tell us useful things about what is really going on out there—but also tells us something about the operation of our own minds (e.g. limits in what we can visually discriminate tells us something about the operation of our visual systems. This provides the data for a first-person account of the mind.

- Viewed from the third-person perspective of an external observer our minds just look like brains—and the operations of mind look like the operations of brain.

Neither first- nor third-person accounts are privileged, and neither is infallible. Rather they are complementary, mutually irreducible—and a complete account of mind requires both.

CONSEQUENCES

- What consciousness is.
- What consciousness does.
- How consciousness relates the world described by Physics, and the thing-itself.
- Subjectivity, intersubjectivity, and different forms of objectivity in science.
- Consciousness, brains, and human information processing.
- Reflexive monism (how consciousness relates to the embedding Universe)


Understanding
Consciousness
MAX VELMANS

HOW EN AND RM DIFFER

Enactivism

1. Is functionally externalist. It stresses that cognition and perception involve sensory-motor brain, body, world interactions and argues that the search for the neural correlates of consciousness is flawed.
2. In some versions (O'Regan & Noe) EN claims that conscious experience is nothing more than exercising of such sensory-motor skills, thereby dissolving the "hard problem" of consciousness (an extended form of functionalism).
3. But EN opposes phenomenological externalism (Noe & Thomson, 2004)

Reflexive Monism

1. Accepts that brain, body, world interactions are important for aspects of cognition and experience that require such interactions. But there are proximal causes and correlates of experience in the brain not all of which are sensory-motor related, so the search for NCCs is not flawed (although it might not be complete)
2. The sensory-motor activities that relate to a given experience usually operate preconsciously (before the experience arises). So conscious phenomenology cannot be reduced to the exercising of sensory-motor skills (e.g. speech)
3. RM makes the radical claim that experiences are roughly where they seem to be. So it is phenomenologically externalist (at least for some experiences).

REFLEXIVE VERSUS ENACTIVE MODELS

- The reflexive model suggests that what we normally think of as the "physical world" is just the experienced world that arises from a reflexive interaction of the perceiver and perceived. First-person and third-person perspectives co-arise. Consequently there never was an explanatory gap between the physical world as-perceived and conscious experience.
- Thomson (2001) (a non-eliminative enactive theorist) takes a similar view, pointing out that the very idea of an "objective world" depends on and arises out of intersubjectively lived experience.
- By contrast, Dennett, O'Regan and Blackmore try to eliminative first-person phenomenology, replacing it with "objective" third-person sensorimotor activity.

MIND-BODY VERSUS BODY-BODY

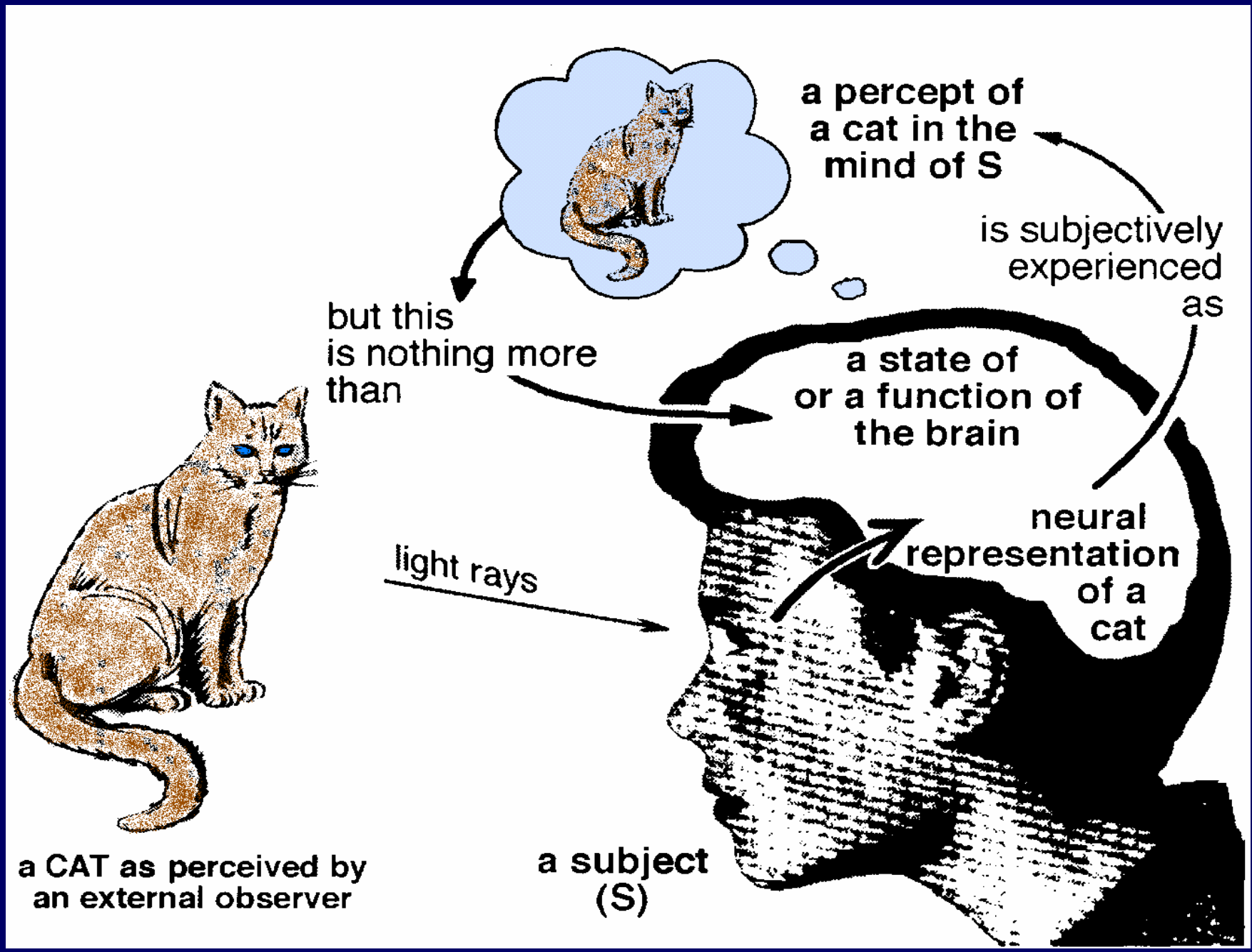
In his own words Thomson (2006) translates the mind-body problem into a body-body problem, i.e. into the question of how the "subjectively lived body" relates to to "the organism or living body that one is". "The body-body problem is a non-Cartesian way of recasting the explanatory gap between the conscious mind and the physical body. In the body-body problem, the gap is no longer between two radically different ontologies ("mental" and "physical"), but between two types within one typology of embodiment (subjectively lived body and living body). The gap is also no longer absolute, because in order to formulate it we need to make common reference to life or living being."

But note again that he is helping himself to subjective experience—arguably finessing the problems posed by phenomenal consciousness rather than addressing them.

CAN EXPERIENCES BE REDUCED TO SOMETHING ELSE?

According to the enactive approach, the human mind is embodied in our entire organism and embedded in the world, and hence is not reducible to structures inside the head. Our mental lives involve three permanent and in-tertwined modes of bodily activity – self-regulation, sensorimotor coupling, and intersubjective interaction (Thompson and Varela 2001). Self-regulation is essential to being alive and sentient. It is evident in emotion and feeling, and in conditions such as being awake or asleep, alert or fatigued, hungry or satiated. Sensorimotor coupling with the world is expressed in perception, emotion, and action. Intersubjective interaction is the cognition and affectively charged experience of self and other. The human brain is crucial for these three modes of activity, but it is also reciprocally shaped and structured by them at multiple levels throughout the lifespan. If each individual human mind emerges from these extended modes of activity, if it is accordingly embodied and embedded in them as a "dynamic singularity" – a knot or tangle of recurrent and re-entrant processes centered on the organism (Hurley 1998) – then the "astonishing hypothesis" of neuroreductionism – that you are "nothing but a pack of neurons" (Crick 1994, p. 2) or that "you are your synapses" (LeDoux 2002) – is both a category error and biologically unsound. On the contrary, you are a living bodily subject of experience and an intersubjective mental being.

But note the way that Thomson sidesteps the classical first- versus third person distinction.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is subjectively experienced as
but this is nothing more than
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neural representation of a cat
light rays
a CAT as perceived by an external observer
a subject (S)