

Where Does Knowledge Come From?

What we will study about the human brain?

Other Cool Questions we Will Consider Along the Way

- What (if anything) is “special” about the human brain?
- Where does knowledge come from?

Where does knowledge come from?

Nancy Kanwisher. 9.13 [The Human Brain](#). MIT OpenCourseWare, 2019.

The formidable questions are “the degree to which human cognition is subserved by domain-specific processing mechanisms” and “the processes by which people link information flexibly across domains” (N. Kanwisher). Pin down the phrase ‘link information flexibly across domains’ and recall the [binding phenomenon](#) (e.g., [Antti Revonsuo](#)): every human being has a unified perception, meaning all sensory inputs are combined into one *coherent* percept. We have two eyes and yet do not see two images, nor do we perceive the color, motion, shape and other visual attributes of an object separately. These attributes are broken up into isolated fragments and are processed by distant sections of the brain. Yet all these distant processes are somehow unified into *one coherent perceptual* experience. The unified nature of perception of *all* sensory modalities brings up the puzzle of how these parts are being brought together — [immensely fast](#), effortlessly, and error-free. This is termed the *binding phenomenon*, and it has been tacitly bypassed by all researchers in the [physics of the brain](#).

What can you achieve with “computational modeling” and “circuit-level computational mechanisms” ([Elizabeth Spelke](#))? A [spherical cow](#), at best.

All this may sound quite complicated, so let's use a very simple example: the *redness* of 'red' (Wikipedia). Suppose its physical correlates are around 650 nm EM wavelength. It is still profoundly unclear how the EM waves are *converted* (not "encoded") into their neurophysiological *correlates* of what will be perceived as 'red', from the optical apparatus of the human eye to the immensely complicated visual cortex. Surely there is no 'red' stuff in the brain, only some *perpetually* changing neurophysiological correlates, which are unique in every brain, *at any instant*. We may call the 'red' Rot (German), nyekundu (Swahili), or Hóngsè de (紅色的, Mandarin), and in all these instances the corresponding neurophysiological *correlates* will be *necessarily* different. Yet their 'meaning' is *invariant* in all human minds.

There is no *invariant* object in all human brains, which can be isomorphic to the *meaning* of 'red'. There is no *library* of such "encoded" concepts in the brain (p. 3). Another example of *meaning* is demonstrated below.

1. You can't hide a piece of broccoli in a glass of milk.
2. Only dead fish go with the flow.
3. Don't wear polka dot underwear under white shorts.
4. A fish has no concept of water.

Which sayings presented similar *meaning*? My answer is 1 & 3. Your brain is certainly different from mine, you may use different languages, etc., but we all can and will identify the *invariant meaning*. Once remembered, it will not decay in time. Worms can't eat it either. Catch my drift?

NB: But where does knowledge come from? I called it *cognitive vacuum*. The issue is highly non-trivial: recall the proposal by Leibniz. One cannot short-circuit the brain and its mind. In my opinion, we need new physics.

Many physicists and philosophers have published and promoted their erroneous speculations about the *physics* of the brain and the origin of mind and consciousness, ensuing from their materialistic religion — the brain is the hardware, the mind is the *software* — known as *antitheism*. As Murphy noticed, complex problems have simple, easy to understand, wrong answers.

The mind, consciousness, volition, and memory (MCVM) have a *physical* "mediator" in the brain, which can be used, for example, to control a drone. This physical "mediator" from the *binding phenomenon* is at the interface of MCVM and its brain, but what is the *physics* that governs the mind-brain relations? Enter the *physics of Life*. Recall Erwin Schrödinger: "We must be prepared to find a new type of physical law. Or are we to term it a non-physical, not to say a super-physical, law?" Can we use this *non-physical* law for *spacetime engineering*? Details at my website *below*.

I thank [Nancy Kanwisher](#) and [Elizabeth Spelke](#) for their brave efforts. They reminded me of Peter Milner's *Physiological Psychology*, which I tried to study and understand in 1975, at age 23. Didn't make it. To quote [Thomas H. Huxley](#): How it is that anything so remarkable as a state of consciousness comes about as a result of irritating nervous tissue, is just as unaccountable as the appearance of the Djinn, when Aladdin rubbed his lamp.

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Addendum 1

In 1971, [Nikolay Kobozev](#) (text in [Russian](#)) showed that the [human reasoning](#) *cannot* be reconciled with thermodynamics. He argued that the rules of [Boolean algebra](#), for example, cannot be encoded in any [physical medium](#), because the latter must be somehow "excluded" from the laws of [entropy](#). Thus, the *invariant knowledge* you acquired from the experiment [above](#) *cannot* be encoded in your good old brain. The "[engrams](#)" in your brain pertain *only* to the neurophysiological *correlates* of the four sayings [above](#). As I argued in [December 1998](#), we operate *simultaneously* at two layers, Platonic ideas and their concrete 'here-and-now' explications. The latter always have their neurophysiological *correlates*, whereas the former exist as '[cognitive vacuum](#)' keeping the [invariant](#) Platonic ideas. Simple, isn't it?

Notice that the cognitive vacuum itself is **UN**speakable. We can "observe" with [introspection](#) only its "virtual particles" that always spring from it, such as the *meanings* of the four sayings [above](#). In short, the **UN**speakable cognitive vacuum is one of the prerequisites for [spacetime engineering](#). We need a *nonlocal* "additional structure on spacetime" (R.M. Wald, p. 286); see [EMM_p63.jpg](#) in my email at p. 6, and [Notes on Spacetime Engineering](#).

Corollary: If you wish to keep your life private, do not convert *anything* to information encoded in *any* physical medium, such as photos, emails, etc. We all are surrounded by very sophisticated spying agencies which are automatically scanning all digital communications and saving everything on their servers. If one day you decide to use [digital yuan](#), all your life will be exposed to the [Chinese PLA](#) as well. To be on the safe side, always follow 'the two rules for success':

Rule #1. Never tell everything you know.

16 November 2021, 12:18 GMT

Addendum 2

I believe have discovered the **fifth force**. It works in all quantum and gravitational systems, as well as in all living organisms, including your **brain**. Read my last email from 15 November 2021 [below](#), with subject: 'Please read it slowly, because it may be one of the most important emails you receive' (in English). In [traditional Chinese culture](#), the **fifth force** is known as *Qi* (氣). It (not "He") is [the fundamental force](#) that makes up and binds together all things in the [universe](#), by following the rule 'think globally act locally'. Only the *inanimate* macroscopic objects, such as the tables and chairs or a [jar with rice](#), and FAPP excluded from it by default. Only dead fish go with the flow ([p. 2](#)).

In life sciences, the **fifth force** can be illustrated with a shoal of fish.



Think globally [act locally](#). See the [human brain](#) and [Slide 12](#).

Thanks to the **fifth force**, every spacetime point from the shoal of fish is capable of **self-action**, namely, every point acts [upon itself](#), [by itself](#). The magnitude of the bootstrapping **fifth force** in the human brain is immensely small, perhaps in the range of the [Casimir force](#). The 'entry point' of the **fifth force** in the geometry of spacetime is explained in [EMM_p63.jpg](#) and in my email from 15 November 2021 [below](#). Just follow the links. For more, please follow the instructions (1)-(2)-(3) at p. 5 (last) in [explanation.pdf](#).

17 November 2021, 11:20 GMT



Dimi Chakalov <dchakalov@gmail.com>

请慢慢仔细阅读，因为它可能是您收到的最重要的电子邮件之一。

Dimi Chakalov <dchakalov@gmail.com>

Mon, Nov 15, 2021 at 1:18 PM

To: zhaoyanwu2000@yahoo.com, xzhang@amss.ac.cn, nester@phy.ncu.edu.tw, cmchen@phy.ncu.edu.tw, kuchar@physics.utah.edu, unruh@physics.ubc.ca, norbert.straumann@gmail.com, helfera@missouri.edu, baez@math.ucr.edu, janusz.garecki@usz.edu.pl, c.isham@imperial.ac.uk, hohanian@uvm.edu, giulini@itp.uni-hannover.de, josemm.senovilla@ehu.es, david_brown@ncsu.edu, joergf@maths.otago.ac.nz, svozil@tuwien.ac.at, erik@strangebeautiful.com, geroch@uchicago.edu, matt.visser@msor.vuw.ac.nz, gfrellis@gmail.com, john.stachel@gmail.com, b.j.carr@qmul.ac.uk, rmwa@uchicago.edu, mtwang@math.columbia.edu

Dear Colleagues,

I believe have discovered the fifth force. It works in all quantum and gravitational systems, as well as in all living organisms, including your brain.

The fifth force is encoded in the rule 'think globally act locally'. Please read

http://www.god-does-not-play-dice.net/SE_201.pdf

<http://www.god-does-not-play-dice.net/brain.pdf>

<http://www.god-does-not-play-dice.net/rule.pdf>

The rule 'think globally act locally' leads to the so-called evolution equation:

read p. 28 (last) in

<http://www.god-does-not-play-dice.net/Intro.pdf>

The first steps toward the equation are explained in

http://www.god-does-not-play-dice.net/EMM_p63.jpg

<http://www.god-does-not-play-dice.net/ESSSAT.pdf>

If you are interested, follow the instructions (1)-(2)-(3) at p. 5 (last) in

<http://www.god-does-not-play-dice.net/explanation.pdf>

Thank you for your very important (although unintended) support.

Yours sincerely,

Dimi Chakalov

<http://chakalov.net>



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Relativistic Cosmology (2012), p. 63, Eq. 3.10

Dimi Chakalov <dchakalov@gmail.com>

Sun, Nov 14, 2021 at 2:16 PM

To: george.ellis@uct.ac.za, m.a.h.maccallum@qmul.ac.uk, rmaartens@uwc.ac.za

Cc: goswami@ukzn.ac.za, t.clifton@qmul.ac.uk, norbert.vandenbergh@gmail.com, jcarm1930@gmail.com, agarca@fis.cinvestav.mx, whkinney@buffalo.edu, ninastei@buffalo.edu, david.wiltshire@canterbury.ac.nz, kludwick@lagrange.edu, niv@slac.stanford.edu, labun@utexas.edu, acvvs@ded.ufrpe.br, claudio.dappiaggi@unipv.it, thomas-paul.hack@desy.de, rmwa@uchicago.edu, gpe@ast.cam.ac.uk, mph@mrao.cam.ac.uk, a.n.lasenby@mrao.cam.ac.uk

Re: George F. R. Ellis, Roy Maartens, and Malcolm A. H. MacCallum, Relativistic Cosmology. Cambridge University Press, 2012, p. 63, Eq. 3.10.

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Dear George, Malcolm, and Roy,

May I ask a questions regarding your Eq. 3.10 (attached).

In 1984, Robert M. Wald warned you that you will need a nonlocal "additional structure on spacetime":

http://www.god-does-not-play-dice.net/Wald_p7.jpg

I could not find this nonlocal structure in your book.

Q: Can you explain the Earth tides?

https://en.wikipedia.org/wiki/Earth_tide#Body_tide

Please note that you can replace all "dark matter" and "dark energy" with the *fifth force*. It works in your brain, too. Details in

http://www.god-does-not-play-dice.net/SE_201.pdf

<http://www.god-does-not-play-dice.net/brain.pdf>

In case you find the task of revealing the *fifth force* too difficult, I trust your colleagues can help you.

All the best,

Dimi

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George F. R. Ellis, Roy Maartens, and Malcolm A. H. MacCallum, *Relativistic Cosmology*. Cambridge University Press, 2012, p. 63.

Energy-momentum conservation

The relativistic energy, momentum and masses of whatever matter fields are present are described by the symmetric energy-momentum stress tensor $T_{ab} = T_{ba}$, which gives the energy and momentum crossing a surface element dS , by the relation $T^a{}_b n^b dS$. The symmetry of T_{ab} is a fundamental property of relativity theory expressing the equivalence of mass and relativistic energy ($E_b = T_{ab}$) and the absence of space-time torsion (the matter field $T_{ab} = T_{ba}$). This result can be derived by considering the balance of the net fluxes of energy and momentum across all faces of an infinitesimally small volume. Conservation of energy and momentum is given by the equation

$$\nabla_a T^a{}_b = 0 \quad (3.10)$$

generalizing the flat-space conservation laws to curved space in the standard way. However, we cannot integrate the quantities $T^a{}_b$ over a finite surface to get a vector conserved quantity in general, because the tensor field does not in general integrate to a vector conservatively over a volume. Nevertheless (3.10) represents the local conservation of energy and momentum, as we see later in the case of various examples such as perfect fluids, electromagnetic fields and scalar fields.

EMM_p63.jpg
227K

The Christoffel symbols cannot rotate planets, stars, and galaxies - D.C.

Energy–momentum conservation

The relativistic energy, momentum and stresses of whatever matter fields are present are described by the symmetric *energy–momentum–stress tensor* $T_{ab} = T_{ba}$, which gives the energy and 4-momentum crossing a surface element dS_a by the relation $T^a = T^{ab} dS_b$. The symmetry of T_{ab} is a fundamental property of relativity theory expressing the equivalence of mass and relativistic energy ($T_{0i} = T_{i0}$) and the absence of macroscopic spin in the matter ($T_{ij} = T_{ji}$). (This result can be derived by considering the balance of the net fluxes of energy and momentum across all faces of an infinitesimally small volume.) Conservation of energy and momentum is given by the equation

$$T^{ab}{}_{;b} = 0, \quad (3.10)$$

generalizing the flat-space conservation laws to curved space in the standard way. However, we cannot integrate the quantities T^a over a finite surface to get a vector conserved quantity in general, because (as mentioned above) we cannot integrate a vector covariantly over a volume. Nevertheless (3.10) represents the local conservation[?] of energy and momentum, as we see later in the case of various examples such as perfect fluids, electromagnetic fields and scalar fields.

4 apples: $T^{ab}{}_{;b} = 0$ 5 apples: $T^{ab}{}_{;b} = 0$ 2 apples: $T^{ab}{}_{;b} = 0$

Have your cake and eat it!

Complicated? Let me try again. Suppose you have a weighing scale with two plates, and a bunch of identical apples. You place 4 apples on the left plate and 4 apples on the right plate, so that the scale is perfectly balanced and the difference between the two plates is “nullified”. Now try with 5 apples on the left plate and 5 apples on the right plate, and finally with 2 apples on the left plate and 2 apples on the right plate. The scale will be always perfectly balanced and the difference will be always “re-nullified”. But suppose you can look (with light) at only one of the plates: you will see 4, 5, and 2 apples, and will conclude that there is some *non-conservation* of apples, correct? Well, the answer is **JAIN**. I suggested in 2015 the so-called evolution equation based on the re-interpretation of “negative mass” (Eq. 1 in [wegtransformierbar.pdf](#)), and will be happy to explain all types of “apples” in it, once I see the paper at arXiv.org mentioned above.

D. Chakalov

23 April 2021, 10:30 GMT