

Note to readers and commenters: Your feedback is welcome.

Here are some ideas:

- have I missed a line of reasoning,
- is there a body of literature or discussion on a certain point,
- or a particular author I should consider here,
- are there examples (pro or con) of the point I'm making,
- is there data (pro or con) related to a point I'm making,
- is my reasoning sound,
- are there counter-examples to conclusions I draw,
- is my writing unclear or ambiguous

Note also that this is a document in progress, which means it may still be in the early stages of resource-gathering and organizing, rather than text-writing

- What are the differences between learning and education?
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Philosophical Foundations of Connectivism

Scepticism

- The creation of scepticism creates the *requirement* that we infer from the mental to the physical.
 - This requirement was addressed first through the [Cartesian method](#) (what we know today as 'analysis and synthesis'),
 - then through [inductive reasoning](#),
 - and finally through to the [scientific method](#) we know today.
- But it's *wrong*.
 - Language, science and reason are incredibly useful constructs, but they are *artifacts*, things we created, rather than statements about the essential nature of thought, perception and humanity.
 - We do not *actually* perceive, learn and know through a process of scepticism, reason and construction.
 - And there is not, in human nature, a separate mental realm that reasons abstractly about the physical realm.
- *There is no requirement to infer to the existence of objects*. Objects are no more or less real than our perceptions of colour, our feelings of hot or cold, our hearing of middle C, or our smelling of maple-smoked bacon.

Consciousness

- consciousness is sensation, no more, no less.
- for a person, consciousness is everything. Everything you know, everything you believe, everything you feel, everything you wish for: that's a part of consciousness.
- consciousness isn't some special property of things over and above everything else.
- *An explanation* of consciousness: When a sensation occurs, our sensory neurons are stimulated. This stimulation proceeds through layers of neurons to produce what we commonly call 'perceptions', that is, our common everyday experience of colours, objects, people, and the like. Consciousness *is* this process.
- I am not saying that the stimulation of neurons *causes* sensations or perceptions. I am offering what might be called an [eliminativist](#) account: consciousness *is* the stimulation of neurons

Intentionality

- the question of how consciousness, thought, beliefs, whatever, turn out to be *about* something.
- if everything is subjective, if everything is sensation, how do we get to the point where we're talking about *objects* like neurons, persons, the city of Paris, or even *ourselves*?
 - a presumption that our thoughts and beliefs about objects and principles and the world at large are the result of a *logical inference* from sensations to beliefs.
 - We now know that there is no such inference.
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- *we experience* our thoughts about objects and the like in the same way we experience sensations
- We might want to *explain how* we perceive objects. but this is no different from the task of explaining how we sense movement or touch or whatever.
- Our thoughts about objects are not *representations* of the external world, they are not *inferred* from experience, they are *sensations* of the external world (which J.J. Gibson would call [direct perception](#)), and are experienced directly.
- The problem of *qualia* (ie., subjective experience) arises only when I am making inferences about the external world. It's like saying that my eye doesn't exist because I

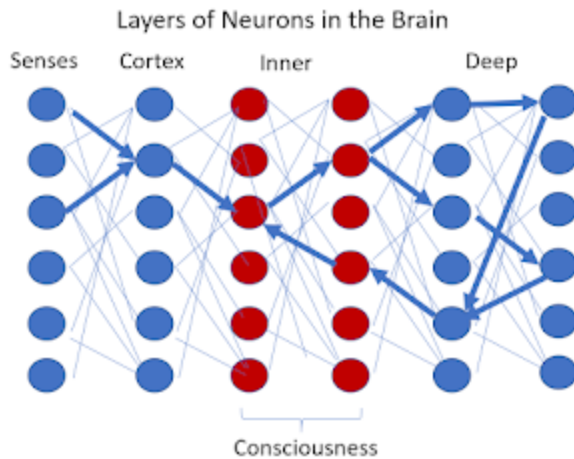
can't see my eye directly. Strictly speaking, that's true, I *can't* see my eye directly - I have to use a mirror or take a picture or some such thing. But my seeing of *anything* is my experience of the eye; my feeling of *anything* is my experience of neurons firing.

- The inference here is not *to* the qualia *from* the physical phenomenon. It's *from* the qualia *to* the physical phenomenon. And that inference, as I've argued above, isn't an inference at all; it's just the way we perceive the world.
- Hume [said](#) we arrive at such ideas easily and naturally, through, he said, custom and habit. We no more infer to the existence of space and time than we infer to the existence of ourselves, to pain, to the colour red. It was this line of thought that prompted Kant to undertake the transcendental deduction. But it wasn't really necessary.

Mind

- what constitutes an explanation of mind and nature?
- There's an important distinction here, and we need to draw it, between describing *the purpose* of something, and *explaining why* that thing happened. Explanations do not require purpose. They do not require intent.
- The Cartesian view - the nature of, and the behaviour of things (language, logic, mathematics, physics) was explained by universals. This fails (cf Hume).
 - There is no principle of logic or reason that will allow an inference from concrete experience to abstract universal.
 - there is no way to confirm, verify, or falsify a putative universal through experimentation or experience
- here's the story: the human brain is composed of layers of connected neurons. The top layer (or outermost layer) is the sensory layer. These neurons are densely interconnected with the next layer of neurons, and the next, and so on. Conscious experience *is* the firing of these inner layers of neurons.
 - We don't just sense what we see, feel, touch, etc.; our sensations might arise out of interactions among neurons anywhere in the brain.

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- Why would the brain feed us sensory images that are 'not real' (that is, not caused directly by external sensations)? [Hermann von Helmholtz](#) suggested that the brain is a [prediction machine](#).

Knowledge

- Knowledge is recognition
- two major types of knowledge: qualitative and quantitative. Distributed knowledge adds a third major category to this domain, knowledge that could be described as connective.
 - Arguably includes functionalism, operationalism
- Connective knowledge is emergent. Emergence is a hard concept, but at this point I can gloss it with a simple characterization: emergence is interpretation applied to connections.
- The emergent properties of a distributed entity exist solely as a consequence of the organization of its parts, and not its membership, and specifically, from the fact that these parts are connected in a certain recognizable way.
- to 'know' that 'snow is white' is to be organized in a certain way (one that is evidenced by uttering 'snow' when asked).
- Having a language is being *organized* in a certain way.... 'knowing' anything is of a similar nature. To 'know' something is not to be possessed of a certain fact. There is no 'instance' of a piece of knowledge in our head. To 'know' is to be organized in a certain

way, to have, if you will, a certain regularly occurring pattern of neural activity (and consequently, disposition to behave). Knowledge is, as Hume said, a 'habit of the mind'.

- What we 'know' about the world is irreducibly interpretive. That is to say, we do not through our senses and cognition obtain any sort of *direct* knowledge about the world
- a structure of connections is, at its heart, artificial, an interpretation of any reality
- When you are manipulating a pattern of entities, order may 'suddenly' appear out of chaos, but what changed suddenly was not the pattern of entities but rather our *perception* of them.

Learning

- The core of Dennett's ideas - and my own - lies in the idea of self-organization.
- The central idea of associationism is this: two things that are relevantly similar become connected in the mind. This connection or association in turn allows knowledge about one to be inferred of the other.
 - Association mechanisms: Hebbian, back propagation, Boltzman, contiguity
 - Two types of connective similarity - similar sets of entities, similar types of networks
- There is no 'magic' to obtaining knowledge, no secret short-cut, save for practice and reflection - Hebbian and Boltzman connectivism.
- our understanding of the existence of connections, and the nature of the networks they form, is something we bring to the table, an interpretation of what we think is salient (and the same is true for the other two types of knowledge)
- Inference is the observation of salient similarities among thoughts and perceptions. It is the recognition of common properties - qualities, quantities and connections - among varied perceptions, and the consequent drawing of connections between those entities, and between other properties of those entities.

Meaning

- meaning, both socially and neurally, have the same origin: meaning is an emergent phenomenon, arising from the connections between underlying entities. Socially, the

underlying entities are speakers of the language, while mentally, the underlying entities are neurons and subsymbolic neural structures.

- The concept of 'redness' is an example of distributed meaning. There is no particular place we could point to where the 'meaning' of 'redness' is located. (We could say 'meaning' = 'connective similarity'?)
- When the meanings of words are distributed, the basis of their meanings - the smaller subsymbolic entities that make up the meanings - are intermingled.
- Connectivism attempts to describe what is *actually* happening in thought and consciousness (because it's not a semantically based language of thought).
- Language, for Wittgenstein, is a public phenomenon... we don't actually 'think in language'.
 - The 'language games' explanation shows why this is a case. Consider a hockey game. We have memories of hockey, thoughts of hockey, but we don't actually have a hockey game in our head.
 - A cognitivist would say we create a semantic representation of hockey in our mind,
 - the meaning of these entities - what is a goal, what is icing (what is 'fetch me a slab', in the language [of the Blue and Brown book](#)) - is determined entirely by the interplay of the people playing the game
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Personal and Social Knowledge

- if a human mind can come to 'know', and if a human mind is, essentially, a network, then any network can come to 'know', and for that matter, so can a society.
- Social knowledge is not *merely* the aggregation and averaging of individual knowledge
- the networks we describe, and in some cases build (or through legislation, protect), are *interpretations* of the multifarious connections that exist in an environment or in a society. They depend, essentially, on a *point of view*.
- Knowing privately that 'Paris is the capital of France' may consist merely of writing the appropriate word on a piece of paper, but knowing the same thing publicly involves a

complex of interactions and behaviours, consisting essentially of immersion (becoming a part of, and entity within the organization) in the knowing community

- What makes some knowledge part of 'social knowledge' and other knowledge (merely?) personal knowledge? Why would a community accept some things as 'known' and not others?

Truth

- Nothing guarantees truth.
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- Just as a network with no connections has no capacity to generate knowledge, a fully connected network has no defense against jumping to conclusions. What is needed is to attain a middle point, where full connectivity is achieved, but where impulses in the network ebb and flow, where impulses generated by phenomena are checked against not one but a multitude of competing and even contradictory impulses.
- Knowledge in the mind is not a matter of mere numbers of neurons being activated by a certain phenomenon; it is an ocean of competing and conflicting possible organizations, each ebbing and subsiding with any new input (or even upon reflection). In such a diverse and demanding environment only patterns of organization genuinely successful in some important manner achieve salience, and even fewer become so important we cannot let them go.
- the mechanism for attaining the reliability of connective knowledge is fundamentally the same as that of attaining reliability in other areas; the promotion of diversity, through the empowering of individual entities, and the reduction in the influence of well-connected entities
- Truth depends not so much on the facts of the matter, but rather, through an examination of the process through which various types of knowledge are accumulated and interpreted. Just as the reliability of an observation report depends on how the observation is made, so to will the proclamations of connected communities of knowers.
- scale-free networks constitute instances in which these criteria are violated
- through attention to the underlying framework informing social and public knowledge, we can find a new renaissance, not perfection, but perhaps, a world less filled with ignorance and superstition.

