

## Does Thought Happen In The Brain?

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### Abstract

What is the nature of thought? Is thought linguistic and some kind of silent speech? Or is it pre-linguistic and some kind of association of ideas and images in the mind? Does it happen in the brain? I will focus on the last question, but also say something about the other two. I will present a simple thought experiment to show that thought must somehow happen in the brain. But then I will soften the impression this might give by pointing out what is needed to read those thoughts. Simply put, ontologically, thought is in the brain, epistemologically, it is not.

We all know that learning how to speak and think requires that we grow up in a society among people who already know how to do so. Without them such learning would not happen. Other people, other brains, and many cultural and bodily features are needed and involved in the process. But once we have learned how to do it, we can close our eyes and think by ourselves. Now imagine someone asks you what is the sum of 227 and 159. You concentrate and close your eyes and after some mental calculation you tell him the sum is 386. When asked the question, vibrations of air strike your ears. Your brain operates and after a while your mouth produces other vibrations of air that reach the ears of your interlocutor, who nods with a smile of satisfaction. The only thing that has happened in the time between the question (the air waves striking your ears) and the answer (your mouth forming other air waves) has been the operations in your body, especially in your brain. Nothing else has had any causal impact of relevance. A bird was flying by and your opponent was eagerly waiting. But this did not matter.

Such a simple thought experiment makes me think that the calculation happens not only in your "mind" as we say, but more specifically in your body, especially your brain. There are no ghosts, neither in your brain, nor outside. If you think the thought experiment is inappropriate because calculating is not thinking, we can imagine another thought experiment. A friend asks you whether you want to have dinner with him next Wednesday in such and such a restaurant. You think about your schedule for next week and whether you really want to have dinner with this friend and whether you like the restaurant for that occasion. After a few seconds, you give an answer. We can also imagine that this happens over the telephone and that you ask your friend to wait for a moment because you have to think. You close your eyes and think about the question for a minute and then reply. Also here, all that went on between the moment when the air waves struck your ears and the moment when your mouth formed other air waves were the operations in your body, especially your brain. Imagining the dinner is something that you can feel in your stomach. It affects your stomach and this affects your decision. The mere thought of seeing your friend again, and being seen with him, is something that you can feel inside of you. The feeling, and the thought, takes place in your whole body, including your fingertips. In any case, all that had a causal impact on the answer in that interval of time was happening in your body. Of course the temperature and general atmosphere in your office also had an influence. But also that was felt and dealt with in your body then.

Based on the above considerations, it seems to me that we can say that thought happens in the body, especially in the brain. But who can read and understand it? If some

smart neuroscientist were to look into your brain while you were adding the numbers or thinking about the invitation for dinner, would he be able to tell what you think? Could he tell what you were about to answer when you had made up your mind? Starting at the end, with your answer: If he had a graphic record of the air waves your mouth produced (1), together with a smart translation manual of such graphic records into written words (0), he could read your answer off in this way. If, moving closer to the thought process itself, he had a graphic record of your brain activities (2) that dictate the movements of your mouth, together with another smart translation manual of such graphic records into the kind of graphic record (1) mentioned above, he could read your answer as well. It is difficult for us to imagine what such graphic records would have to look like, but it is even more difficult to imagine how reading your thoughts in the middle of the process of thinking (3) would look like, because especially for this we do not have the appropriate words at all. They would have to be invented by cognitive scientists. Thoughts in the making are vague, momentary, and fleeting. Also the experimental data are not available so far. Maybe one day they will. Then the words will be invented, and mind reading will be possible to some degree and in some way. What is going on in the brain is very different from words and well-formed sentences as we have them now, and it is also different from what we now understand by "thought" (because we have very limited understanding of it so far). There is a long way from neuron firings to our present, everyday understanding of thought, be it in terms of words or images. If in the future more data are available and a new vocabulary has developed with those data, mind reading will be possible to some degree. But it will not be a mapping as we might expect it now, because at present time we do not have the words for such mind reading. At least so far we don't.

This brings me back to the other two questions raised at the beginning of this essay: Is our thinking linguistic and some kind of silent speech? Or is it pre-linguistic and some kind of association of ideas and images in the mind? Bennett and Hacker in *Philosophical Foundations of Neuroscience* (2003) have argued that thought depends on language. A dog can be said to expect to be taken for a walk when it becomes excited because it hears his master come. But does this mean that the dog "thinks" it will be "taken for a walk"? I have my doubts here. Peter Hacker is more generous, or optimistic, here. He writes: "It makes perfectly good sense to say of a dog that it thinks something or other, as long as what it is said to think is something that can be manifest in its behavioural repertoire. A dog may now think that it is going to be taken for a walk – if it hears its leash being taken off the peg, it rushes excitedly to the door, wagging its tail and barking excitedly. But it cannot now think that it is going to be taken for a walk

next Wednesday.” (335). I think it is problematic, even without mentioning Wednesday, to say that a dog can think it will be “taken for a walk”, because our description uses the words “taken” and “walk” and I am not sure that dogs have comparable concepts. Bennett and Hacker think of a comparable behavioral repertoire and maybe I could accept this.

A similar problem can be seen in a passage from Wittgenstein in which he compares expectation to fulfillment, as well as the imagination of seeing to the actual seeing of someone coming into a room: “How does it look when he comes? – The door opens, someone walks in, and so on. – How does it look if I expect him to come? – I walk up and down in the room, look at the clock now and then, and so on. – But the one occurrence does not have the slightest similarity to the other! So how can one use the same words in describing them? – But perhaps I say as I walk up and down: ‘I expect him to come’. – Now there is a similarity at hand. But of what kind?” (PI 444, translation by Malcolm) Norman Malcolm in the essay “The Mystery of Thought” has commented on this passage. He says: “The similarity between the two lies in the language” (193), and he quotes Wittgenstein: “It is in language that expectation and fulfillment make contact” (PI 445). In PI 444 Wittgenstein also says, that “language abstracts” from the difference, for instance regarding expectation and fulfillment. I think this makes sense when the issue is about our human thoughts, expectations, and imaginations, because we humans have language and for us language can be said to abstract from differences. But dogs cannot speak. Hence I would not be sure about this way of relying on language to bridge the gap between our thinking “he comes” and a dog’s supposedly thinking “he comes”. Dogs cannot speak. They do not have a say in this.

Of course, in the passages quoted above, Malcolm and Wittgenstein are concerned with human thought in relation to language, not about animal thought. Malcolm concludes: “When we speak truthfully and without deceiving ourselves, the objects of our thought are what we say they are. There is no gap between our language and the objects of our thought, a gap that needs to be bridged by surrogates or mental intermediaries” (194). This I think makes sense in case we have words for our thoughts, such as “I expect him to come”. But it will be problematic when we think of human thoughts that are in the process of developing and where the words to describe them are not available. This is comparable to the situation when we think of what a dog might be “thinking”. In both cases, we lack data, insight, and vocabulary.

Instead of focusing on animals, let me introduce ways of thinking we humans sometimes entertain and that are also not easily translatable into words. Bennett and Hacker give useful examples here, namely from mathematical thought. They quote Einstein saying: “The words of the language, as they are written or spoken, do not seem to play any role in my mechanism of thought. The psychical entities which seem to serve as elements of thought are certain signs and more or less clear images which can be ‘voluntarily’ reproduced and combined” (338). Similarly, Roger Penrose writes: “Almost all my mathematical thinking is done visually and in terms of non-verbal concepts. ... Often ... there simply are not the words available to express the concepts that are required. I often calculate using specially designed diagrams which constitute a shorthand for certain types of algebraic expression. ... This is not to say that I do not sometimes think in words, it is just that I find words almost useless for *mathematical* thinking.” (ibid.) I agree. I myself used to be a professional mathematician before turning into a professional philosopher, and I agree with

Penrose’s description. I also imagine that architects and all kinds of handicraft workers, sportsmen, and musicians do not think in words but rely on visual and bodily concepts that we do not easily have words for in our everyday language. They use these concepts when they work and play intuitively, and these concepts are rooted in their body in relation to certain tools, instruments, and other forms of environment. These are know-how concepts that are imbedded in the life-worlds of these practitioners and we do not easily have words for them. Linguistic thoughts form only part of the world of thought. Of course taking things this way presupposes a wide notion of concept and thought, one that includes know-how concepts. I tend to subscribe to such a notion.

Bennett and Hacker argue that Penrose’s description of mathematical thought is “misleading” (345), because a mathematician still thinks in “universally accepted symbols” and concepts that have “rule-governed use” (ibid). I disagree. I believe that relying on symbols and their rule-governed use is not Penrose’s main point. Creative mathematical thought also involves foggy, imprecise, ambiguous, momentary, private diagrams and procedures for which we do not have rule-governed, fixed, and universally accepted symbols. It is here, in this fog, where I think inspiration takes place. How else should it happen? (See Wenzel 2001)

Coming back to the question of whether thoughts happen in the brain, or body, I would say, yes, they do. But I would immediately add that in order to understand them one needs to understand their use as well. One cannot just look into the body, or brain, from the outside and read the thoughts off there, without having the right translation manual, which in turn requires the proper words, which unfortunately we often do not have. Allow me to illustrate this with an analogy. To understand what a car is, you must know how it is used. If a car were transported into another world that has no gravitation, the people living there would have a hard time figuring out what a car is by just looking at it. The wheels in that world would be literally “spinning in the void”, if I may use metaphor, one McDowell uses to explain that concepts go “all the way out”. Concepts are rooted in perception and use. Similarly, cars must be driven on the road. Thoughts must be put into action. The handicraft worker has know-how, and the researcher in mathematics engages in non-standard operations. For this we often do not have the appropriate words, as we don’t have them for the thoughts happening in their brains.

The passage from Wittgenstein, quoted above, is about thoughts that can be expressed in words. But I think that for many of our thoughts and concepts we do not have suitable words. In this I assume a wide notion of what thoughts are. Furthermore, I imagine thoughts when they gradually unfold and develop. I think of the process of thinking. When doing research, mathematicians not only use formulas but also they often imagine things in idiosyncratic and non-standard ways, allowing variation, modification, vagueness, and indeterminacy, and even, momentarily, contradiction. Handicraft workers use their hands and they show us how to do things. Musicians and athletes perform and play for us to see and hear. This is how they express themselves. Words do not suffice. Bennett and Hacker say that the limits of thought are the limits of “behavioral repertoire” and “possible expression” (335). That is fine, but I wish to add that behavioral repertoire and expression do not need to be standard. They can be idiosyncratic. The same applies to thought, for instance as it occurs in a researcher’s mind. Supposing that “a concept is

an abstraction from the use of words” (339) makes the notion of a concept too narrow, at least to my taste.

In any case, it seems to me that, no matter how much one restricts thought to linguistic thought, it remains true that, on the one hand, thought *happens* in the body (brain) and, on the other hand, being able to read this kind of thought (in the body, and especially in the brain) requires an *understanding* of the use of the relevant concepts. Looking at the handicraft worker, the athlete, or the musician in order to understand what they think and what is going on in their minds, one must understand what they do. (Just as, in order to understand what a car is, one must know how to drive it in this world.) It will be difficult to come up with a translation manual from brain activity into words, because we do not have the right words to express how the activities of handicraft workers, sportsmen, musicians, or mathematicians are actually formed. Too many factors come in. We do not have words to express know-how thoughts. We often prefer to show what we mean. Nor do we have the words to express the process of inspiration in doing research in mathematics.

From such considerations we can see that it will be difficult to read brain activities. This applies to thoughts in general when they are in the process of being developed and formed. Talking about this does not belong to our rep-

ertoire. Thought is hidden, fleeting, complex and momentary. I think we could bring it out to some degree, but so far we do not have the words for such momentary processes. We only have the words for our everyday activities as far as we can make distinctions, plus the specialized vocabulary used by scientists and other specialists. But so far we neither have the words to describe brain activities nor the data of those activities. At least we have very little of this at the moment. Things will change, as our life worlds will change. Mind reading will have to become everyday, at least for some specialists. But that is for the future.

## Literature

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