
Peter Carruthers, *The Centered Mind: What the Science of Working Memory Shows Us About the Nature of Human Thought* (Oxford and New York: Oxford University Press, 2015), 290 pp.

Peter Carruthers is one of the most famous and most successful contemporary philosophers of mind. He has specialised in philosophy of mind informed and guided by the results of cognitive science. Carruthers has been known to call himself a *theoretical psychologist*, in comparison with theoretical physicists, who rarely perform experiments themselves but only use the results of experimental physicists to construct their theories. Similarly, Carruthers constructs theories about the mind based on the results of the empirical experiments. Currently he is employed at the University of Maryland and before that he was a professor of philosophy at University of Sheffield. He was the founder and the director of *Hang Seng Center for the Cognitive Studies*.

Most of Carruthers's work is systematic which means that most of his books are interconnected, both by subject problems and by solutions to those problems. *The Centered Mind* has the most connections with his last book *The Opacity of Mind* (2011). In *The Opacity of Mind*, Carruthers argues for the claim that we never have introspective access to our propositional attitudes. People have introspective access only to sensory-based representations, but our propositional attitudes we come to know only through interpretation of sensory-based representations. We hear ourselves expressing the propositional attitudes in inner speech, but those are sensory-based representations, not propositional attitudes themselves. In *The Centered Mind* he expands his sensory-based view in hope of elucidation of the nature of the human thought.

Carruthers believes that we can catch a glimpse of the nature of the human thought by analysing the stream of consciousness and, more specifically, conscious reflection. He wants to provide a theory which will explain what determines the contents of the stream of consciousness. In his familiar style, he is arguing against two intuitive claims. One of these claims concerns the question of propositional attitudes as contents of the stream of consciousness and the other one concerns the possibility of passivity of mental activity.

The first intuitive claim he argues against is that amodal propositional attitudes occur among the contents of the stream of consciousness. It seems that in the stream of representations which occur in our minds there are such things as beliefs, desires, decisions and similar types of attitudes. Everybody agrees that in the stream of consciousness there are sensory-based representations such as perceptive and imagistic representations, but Carruthers claims that those kinds of representations are the only ones which ever appear in the stream of consciousness. Amodal propositional attitudes never appear in our reflection!

Carruthers builds the defence for this claim on the same grounds he builds the defence for the claims against introspection in *The Opacity of Mind*. As a starting point he endorses two widely accepted cognitive theories. The first one is the *global broadcasting theory*. Proponents of this theory claim that in the human mind there exists a series of specialised mechanisms for solving very specific problems. These mechanisms share a *global workspace* into which they broadcast the results of their processes. Once the results are in the global workspace, every mechanisms can access it. This enables the mechanisms to use the results of many processes without having to perform the processes themselves. The second theory which Carruthers builds his defence on is the *sensory-based theory of working memory*. The working memory system is specific because it can contain and manipulate different kinds of sensory-based representations. This is the system which produces our inner speech and the stream of visual imagery. There is ample empirical evidence that both the working memory system and the global broadcasting architecture are purely sensory-based which provides a strong support for the Carruthers's claim that all thought, i.e. all contents of the stream of consciousness, is sensory-based.

There is also a lot of evidence for the claim that the differences in working memory across the population can explain the differences in general intelligence across the population. Carruthers uses this claim to argue that there is no special working memory system in which propositional attitudes interact. His argument is a form of the inference to the best explanation. If the human mind had such *attitudinal* working memory system, we would expect it to be responsible for the differences in general intelligence between people. But, the differences in the general intelligence are best explained by the differences in *sensory-based* working memory system. Therefore, there is no evidence that the attitudinal working memory exist, and the best explanation of our stream of consciousness is that it is always sensory-based.

The second claim Carruthers argues for in this book is that there is no passive (or unpurposeful) mental activity. Intuitively it seems to us that mental activity takes both forms, passive and active. An example of active mental activity is solving a mathematical problem in one's head. When a song comes to our mind, seemingly without reason, we believe that it is a form of passive mental activity. But Carruthers claims that even those instances of mental activity which seem passive are in fact active in the same sense as those which seem active. The difference is that we sometimes believe we know why we entertain a certain thought and sometimes we believe we don't know why we entertain a certain thought. We characterise as passive those mental activities for which we believe we do not know the reason why they occur.

To support this claim more firmly Carruthers proposes that all mental activity is actually mental rehearsal, which is controlled by the suppressing of

our *mental action plans*. When we speak, act or decide to do something we create a mental action plan which instructs the executive systems what to do. So when we want to say something we create an action plan of the exact bodily movements needed to utter a certain sentence.² Sometimes we suppress our action plans from causing our bodily movements which results in mental rehearsal of that action. Mental rehearsal is actually mental imagery – inner speech, visual imagery, proprioceptive imagery... Because mental rehearsal is actually the same process as normal action, only without the last step – the execution of bodily movements, Carruthers concludes that mental rehearsal is also a type of action. Therefore, all mental activity is best explained as active.

To recapitulate Carruthers's story. The system in which the stream of consciousness and conscious reflection take place is the working memory system. Contrary to the intuitive view, propositional attitudes never occur in the working memory system, i.e. in the stream of consciousness. Therefore, the stream of consciousness is always sensory-based, with propositional attitudes only bound into sensory representations (seeing something (x) as a car has bound into itself a decision that something (x) is a car). Propositional attitudes, nevertheless, are real. Their role is executive, in directing our attention. The focus of our attention is determined by our beliefs, desires and conclusions. Sometimes it is not hard to see which propositional attitudes directed our attention and sometimes this seems impossible. In the first case we think of our mental activity as active, and in the second case we think of it as passive. But in fact all mental activity is active because all mental activity is the result of the same process of suppressing our mental action plans.

As Carruthers says in the concluding chapter of his book, the overall argument of the book is an inference to the best explanation. The best explanation of the stream of consciousness is that it is always sensory-based. Carruthers supports this claim with a number of other inferences to the best explanation – that the contents of working memory are always sensory-based, that the differences in the general intelligence are due to the differences in sensory-based working memory, that humans could not have evolved an attitudinal workspace because of the more ancient cognitive structures, that we never have introspective access to our propositional attitudes (this was the conclusion of his last book, and the overall argument of that book was also an inference to the best explanation supported by a number of other inferences to the best explanation). This is the source of my biggest concern about this book – a concern which can perhaps be extended to the whole project of

²What we “want” to say or do is determined by our attentional systems. The focus of our attention is determined by our amodal propositional attitudes. This is the place and the role for the propositional attitudes in Carruthers's cognitive architecture.

explaining the mind in terms of computational cognitive science. Inference to the best explanation is a valid form of an argument. But it seems that an argument which has a form of an inference to the best explanation and is supported by a number of other inferences to the best explanation, which are supported by a number of other inferences to the best explanation, loses a little bit of plausibility with every inference to the best explanation provided in its support. Every particular inference is plausible, but in the end we are left with a weird feeling that we have accepted an argument which is not supported well-enough.

In the end, I would like to say that *The Centered Mind* is an excellent book and one of the best examples of efforts to explain the mind scientifically. The book is definitely not an introductory one, but I would recommend it to anyone who is interested in a scientific explanation of the stream of consciousness because Caruthers's clear writing and thorough referencing makes the book accessible even to beginners.

Mihovil Lukić

Centre for Croatian Studies of University of Zagreb
Borongajska cesta 83d
HR-10000 Zagreb, Croatia
mlukic@hrstud.hr

Elvio Baccharini, *In a Better World: Public Reason and Biotechnologies* (Rijeka: University of Rijeka and Faculty of Humanities and Social Sciences, 2015), 170 pp.

Many books have been published trying to determine the moral status of the use of some biotechnologies (e.g. genetic interventions, cloning, moral bioenhancement and the extension of human lifespan). Practical ethics has been trying to answer these and similar moral problems for more than a century, and all this time the central question has been “What is the *right* thing to do?”. In his recent book Elvio Baccharini does not address this question – well aware that in the conditions of reasonable pluralism of moral and religious doctrines we cannot publicly agree upon what should we do as a political community and which laws and policies are the right or the virtuous ones, he shifts the central question from the domain of practical ethics to the domain of political philosophy by asking “What is the *legitimate* thing