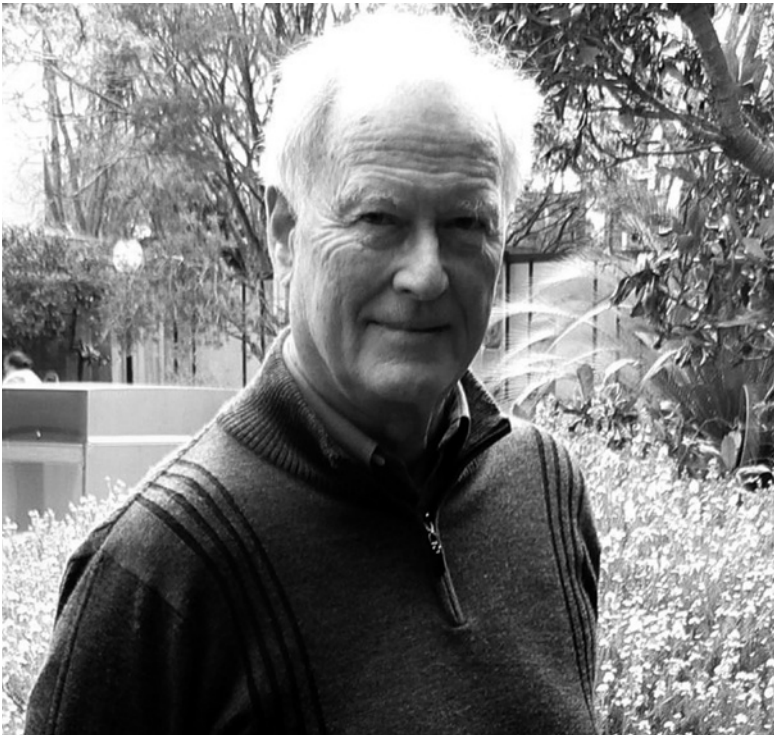
THE WANDERING MIND

WHAT THE BRAIN DOES WHEN YOU'RE NOT LOOKING

MICHAEL C. CORBALLIS



Michael C. Corballis is professor emeritus at the University of Auckland. An outstanding science communicator, reviewers have hailed Corballis for telling 'a captivating story' (*New York Times*) with writing that is 'informative and entertaining' (*American Scientist*). Corballis is author most recently of *The Recursive Mind: The Origins of Human Language, Thought and Civilization* (Princeton University Press, 2011) and *Pieces of Mind: 21 Short Walks around the Human Brain* (Auckland University Press, 2011), which was translated into three languages and published in three English-language editions.

Michael Corballis is a brilliant cognitive psychologist and a clear and witty writer on language, mind, and evolution. — Steven Pinker, Harvard University

While psychologists write bestsellers about humans' smarter side—language, cognition, consciousness—and self-help gurus harangue us to be attentive and mindful, we all know that much of the time our minds are just goofing off. So what does the brain do when you're not looking?

Rooted in neuroscience, psychology and evolutionary biology but written with Corballis's signature wit and wisdom, *The Wandering Mind* takes us into the world of the 'default-mode network' to tackle the big questions. What do rats dream about? What's with our fiction addiction? Is the hippocampus where free will takes a holiday? And does mind-wandering drive creativity?

In *Pieces of Mind,* Michael Corballis took 21 short walks around the human brain. In *The Wandering Mind* he stretches out for a longer hike into those murky regions of the brain where dreams and religion, fiction and fantasy lurk.

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CHAPTER 3
ON TIME

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Time present and time past
Are both perhaps present in time future . . .
—T. S. Eliot, from *The Four Quartets*

Remembering is mind-wandering into the past. We can also wander into the future, imagining what might happen tomorrow, or next Christmas, or when the Antarctic ice melts. The evidence shows, in fact, that people spend more time thinking about the future than about the past. Nevertheless, there is a natural continuity between future and past, as time glides relentlessly from one to the other. What we're about to do quickly becomes what we have done—assuming we actually do it. Sometimes we don't, and when that happens we're inclined to say: 'Well, I forgot.' Even forgetting, it seems, can apply to the future as to the past.

Our ability to travel mentally into past and future, and the smooth continuity between them, underlies our sense of time itself. Although we can mentally travel in either direction, our physical lives are rooted to the present while time flows by. Downstream lies that singular event we all mercifully forget—or were incapable of remembering—called birth, while the lines of Isaac Watts' hymn 'Our God, Our Help in Ages Past' remind us of what lies upstream:

Time, like an ever rolling stream,
Bears all its sons away;
They fly, forgotten, as a dream
Dies at the opening day.

But although our actual lives are imprisoned between birth and death, we can mentally travel beyond both. History can be brought alive through past records and texts, or the discovery of ancient artefacts, and embellished in historical novels or movies. Futuristic scenarios can tell of brave new worlds, or impending disaster. Ray Bradbury's dystopian novel *Fahrenheit 451* depicts a future America where books are forbidden, and houses containing books are ordered to be burned. This dire outlook doesn't seem to have affected sales, although Bradbury himself is reported to have said: 'I wasn't trying to predict the future. I was trying to prevent it.'

Once we humans discovered the concept of time, we could then ask how far it can be stretched. Physicists tell us that a big bang 13.77 billion years ago started it all, and 7.5 billion years in the future the sun will grow so large it will gobble up the earth. These cataclysmic events, I think, take us well beyond the imaginable—well outside the limits of mental time travel, although I suppose we might well entertain the possibility of moving to somewhere in space where there is a less voracious sun. Dream on.

We rely very largely on our remembered pasts to construct our futures. Memory, in the form of knowledge as well as of remembered episodes, provides the building blocks from which to construct future plans. In the previous chapter, I referred to experiments in which people are asked to remember 100 episodes and identify a person, an object and a location. These experiments then continue as follows. We rearrange the remembered elements into new combinations, and our subjects are then asked to imagine future episodes built around them. For instance, a subject might remember her friend Mary dropping her laptop in the library, her brother Tom falling off his bicycle in the park, or

her partner Shane cooking sausages in the kitchen. She might later be asked to imagine a future episode with her friend Mary cooking sausages in the park—an event that never happened, but is easily imagined. Our studies show that the areas in the brain activated by remembering the past events overlap extensively with the areas activated by the imagined future events. The brain hardly knows the difference.

People with amnesia typically have as much difficulty in imagining future events as they do in remembering past ones. Neither Henry Molaison nor Clive Wearing, whom we encountered in the previous chapter, could envisage future episodes any more than they could remember past ones. Deborah Wearing entitled her book on Clive *Forever Today*, and Suzanne Corkin called her book on Henry Molaison *Permanent Present Tense*; both titles capture the fact that both Clive and Henry had no sense of either past or future. Their minds were stuck in the present, with nowhere to wander. When Henry was once asked: 'What do you think you'll do tomorrow?' he replied: 'Whatever is beneficial.' Perhaps his inability to mentally wander into past or future relieved him of the worry that often plagues our mind-wanderings, and made him an exceptionally agreeable and cooperative subject.

Here's another patient with deep amnesia, known as 'N.N.', in conversation with the psychologist Endel Tulving:

E.T.: Let's try the question again about the future. What will you be doing tomorrow? [There is a 15-second pause.]

N.N.: I don't know.

E.T.: Do you remember the question?

N.N.: About what I'll be doing tomorrow?

E.T.: Yes. How would you describe your state of mind when you try to think about it? [A 5-second pause.]

N.N.: Blank. I guess.

When asked to compare his state of mind when he is trying to think about what he will be doing tomorrow with his state of mind when he thinks about what he did yesterday, N.N. described it as 'a big blankness' that was 'like swimming in the middle of a lake. There's nothing there to hold you up or do anything with.'

Many of the scenarios we envisage in the future, such as a dinner party, are based on past episodes, with some rearrangement to accommodate a new location, or a new combination of people. Perhaps this helps explain why memory for episodes itself is not always accurate. If we are to design futures based on our memories, we need our memories to be useful rather than accurate. By constructing possible futures, we can then select what seems the best plan—the most fun, perhaps, or the least likely to prove disastrous. In our mind's eye, we can imagine different scenarios for a wedding, say—where to hold it, who to invite, what music to play, even whether to go through with it. We play out different versions of a job interview, a new date, a tennis match, with the hope of figuring out the best strategy. The very flexibility of our memories can make for well-adjusted futures, but play havoc with the remembered past.

As children grow, their capacities to remember the past and imagine the future seem to surface together, somewhere between the ages of three and four. Neither capacity, though, comes about as a sudden dawning. Three-year-olds often seem unable to tell you what happened at nursery school or playcentre, or what might

happen tomorrow, yet they learn things, such as new songs or games—even new words, some of which they shouldn't use. They may have a sense of things that happened, or that will happen, but lack the mental machinery to put together a coherent scenario. Work by Thomas Suddendorf and colleagues suggests, though, that by age four most children have the basic mental components to be able to construct a possible future event. It may be that language in younger children is not well enough developed, so they can't find the words to describe what they did or what they plan to do. This argument, though, can be reversed. Language itself is designed to convey the non-present, and perhaps doesn't really develop until the sense of time itself emerges. In evolution, too, some capacity for mental time travel may well have evolved before we gained the ability to talk about our mental travels, as I shall suggest in the next chapter.

In the previous chapter, I suggested that we adapt our memories to create images of ourselves—politicians, for instance, seem especially prone to recalling acts of heroism that did not actually occur. We also create future images. William James, brother of the novelist Henry and regarded by some as the founder of scientific psychology, wrote of 'potential social Me' as distinct from 'immediate present Me' and 'Me of the past'. More recently, Hazel Markus and Paula Nurius write similarly of 'possible selves', based on how we see ourselves in the past but looking forward to new images of the self in the future. The idea of different possible selves provides much of the motivation that guides us as we plough through life. As Markus and Nurius put it: 'I am *now* a psychologist, but I *could* be a restaurant owner, a marathon runner, a journalist, or the parent of a handicapped child.' Future images can be both positive and

negative—I can imagine myself as a roaring success, whether at parties, on the rugby field, or in scientific achievement, or I can see myself as a dismal failure at everything I do. Sigh.

Our imagined future selves can even extend beyond death. The ability to imagine beyond the reach of a lifetime reinforces religious belief, as we create for ourselves imagined heavens or hells. People can even be induced into bleak and self-destructive actions in their present lives through promise of a better life after death. Muslim children are taught from an early age that the main purpose of life in this world is to prepare oneself for an eternal and blissful life in the next, a promise that no doubt helped motivate the terrorists who flew planes into the Twin Towers in New York on 11 September 2001. The Japanese kamikaze pilots who died for their emperor in World War II may have similarly believed that they would be rewarded in the next life. Kamikaze means 'divine wind', and also refers to a cocktail made of triple parts vodka, triple sec and lime juice—a cocktail, perhaps, to die for. Various Christian sects have also indulged in flagellation, vows of poverty, or vows of silence, perhaps in the hope that they would lead more idyllic lives after death. The very notions of heaven and hell can be used to great effect to manipulate human behaviour, often for the benefit of kings and overlords. The offer of life after death, with associated rewards and punishments, is remarkably ingenious, since there seems no way in which we can be either gratified or disappointed—at least if these emotions are restricted to the living.

There may be less reason to believe in a life before one's own incarnation, since it has little consequence for the present life—although it may lead one to claim special qualities based on an earlier existence. One of my former classmates fervently believes

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