What is our Real Knowledge about the Human Being
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SOUL-SEARCHING AND MIND-READING ISSUES RAISED BY 21st CENTURY NEUROPSYCHOLOGY AND EVOLUTIONARY PSYCHOLOGY

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Attempts to answer the question posed by Saint Augustine almost two millennia ago, 'What then am I, my God? What is my nature?', remained for many centuries the almost exclusive domain of philosophers and theologians. Today questions about human nature have moved centre stage in some media accounts of possible wider implications of scientific discoveries made primarily by neuroscientists and evolutionary psychologists. Developments in both fields over the past few decades have been remarkable. At the inaugural meeting in 1969 of the Society for Neuroscience there were fewer than 100 participants. By 2004 there were 27,000, such has been the exponential growth in the amount of effort and funding devoted to brain research.

It is arguable that the Nobel laureate David Hubel initiated the fresh impetus of research in neuroscience by his discoveries, with Torsten Wiesel, of brain cells that responded selectively to bars of light depending on their orientation. Two decades later as he reflected on the advances made, he wrote, 'Fundamental changes in our view of the human brain cannot but have profound effects of *our view of ourselves* and the world' (my italics).

The attention-grabbing book by Nobel laureate Francis Crick entitled *The Astonishing Hypothesis* contained such provocative statements as, 'The idea that man has a disembodied soul is as unnecessary as the old idea that there was a Life Force. This is in head-on contradiction to the religious beliefs of millions of human beings alive today'. Crick maintained his views until shortly before he died in 2004 when he further asserted, 'in the fullness of time educated people will believe there is no soul independent of the body, and hence no life after death'.

More recently it has been the rapid expansion in the relatively new and specialised field of evolutionary psychology which has raised questions about, for example, the uniqueness of human beings. According to the media with every fresh discovery the gap between humans and non-human primates seems to be narrowed. There is no doubt that such developments in research at the interface of psychology and evolutionary biology will continue to produce exciting and challenging discoveries.

In the late 1980s an unanticipated bridge appeared between neuroscience and evolutionary psychology when Giacomo Rizzolatti and his colleagues at the University of Parma discovered what have become labelled as mirror neurons. Initially this discovery attracted little attention. However, it was thrust into the limelight when the high profile neurologist Ramachandran predicted that 'mirror neurons will do for psychology what DNA did for biology: they will provide a unifying framework and help explain a host of mental abilities that have hitherto remained mysterious and inaccessible to experiments… and thus I regard Rizzolatti's discovery as the most important unreported story of the last decade'.

Research at the Interface of Psychology and Neuroscience

Within the communities of scientists, humanists and religious people there have been well-publicised speculations about how some of our traditional ways of thinking about human nature may need to change as we take account of the impact of some of the discoveries in neuropsychology.

With the advent in the 1960s of the so-called cognitive revolution in psychology, together with rapid developments in experimental techniques by psychologists and the developing field of brain imaging, rapid progress resulted in neuropsychology. The results from study after study demonstrated the intimate links between mind and brain, what used to be called soul and body. Mind was seen to be firmly embodied in brain. It became more and more difficult for most neuropsychologists to defend a view of human nature which claimed that there is within each of us an immaterial part labelled the soul, a part which, because immaterial, might be expected to be invulnerable to changes, whether naturally occurring as in old age, or by accident or destruction in our brains.

The accumulating neuroscientific evidence made traditional dualism an increasingly difficult position to defend. Nevertheless it remained possible to line up equally distinguished neuroscientists, Nobel laureates in their field, who would, on the one hand, such as the late Sir John Eccles, defend dualism and others, such as the late Roger Sperry, to argue against dualism.

It was Roger Sperry who emphasized the crucial importance of giving full weight to mental activity, to psychological process, to what he called 'top-down' processes. He had no time for reductionism. He did, however, see that the intimate links between mind and brain posed, with a new urgency, questions about how free we are to choose and to act. The relevance of these questions became more pronounced as evidence emerged for differences, for example, between the brains of psychopaths and normals. How responsible were some psychopaths for their behaviour? Similar dramatic findings began to emerge from case studies of individuals engaged in paedophilia and other forms of abnormal sexual behaviours.

It is important remember that these are not issues exclusively for people with a religious commitment. They are, as the recent book, *The New Neurosciences: Perils and Pitfalls* underlines, in its sub-title, issues for all thoughtful people, humanists and religious people alike.

In my presentation I shall give, for the nonspecialist, examples of state-of-the-art research in neuropsychology. Some of these examples will come from approaches usually labelled 'bottom-up' approaches. By this is meant that changes are made in the basic neural substrates and then the results of such changes carefully observed as they manifest themselves in cognition and behaviour. Other examples will come from so-called 'top-down' researches. Using these methods it has been possible to map out ways in which cognition and behaviour habitually engaged in, can be shown to 'mould' or 'sculptor', selectively, different parts of the brain.

It will be argued that it is sensible to follow the advice of neurologists such as Antonio Damasio when he wrote, 'The distinction between diseases of brain and mind and between neurological problems and psychological/psychiatric ones, is an unfortunate cultural inheritance that permeate society and medicine. It reflects a basic ignorance of the relation between brain and mind'.

These comments of a neurologist were echoed by a recent Past President of the Royal College of Psychiatrists in Britain, Robert Kendell, when he wrote, 'Not only is the distinction between mental and physical ill-founded and incompatible with contemporary understanding of disease, it is also damaging for the long-term interests of patients themselves'.

I shall hope to open up a discussion of how most appropriately to think about the intimate links between mind and brain. For debate I shall suggest that we need to give full weight to an irreducible duality of human nature best thought about as a duality of aspect rather than a duality of substance. I shall further suggest that it is more helpful to talk about

interdependence between brain and mind, rather than an identity or interaction. Mental activity and correlated brain activity may be regarded as inner and outer aspects of one complex set of events that together constitute conscious human agency. Two accounts can be written about such a complex set of events, the mental story and the brain story, and these demonstrate logical complementarity.

Mirror Neurons: a Bridge from Neuroscience to Evolutionary Psychology

The mirror neuron story began fourteen years ago, when Giacomo Rizzolatti and his colleagues reported the discovery of neurons in the frontal parts of the brains of monkeys which possessed functional properties not previously observed. Whilst their report caused considerable interest among neuropsychologists, it passed largely unnoticed by evolutionary psychologists. These unusual neurons located in an area known as F5 in the primate brain, did not respond when the monkey was presented with a conventional visual stimulus. Rather, they were visually activated when the monkey saw another individual, whether the experimenter or another monkey, making a goal-directed action with a hand, or, in some cases with the mouth. The responses evoked were highly consistent and did not habituate. The unusual properties of these cells were that they were active, not only when the monkey itself initiated a particular action, but also when the animal observed another monkey initiating and carrying out the same action. For this reason, they were labelled by some 'monkey-see, monkey-do' cells. One of the co-authors of Rizzolatti's paper, Vittorio Gallese, speculated that one of the primary roles of these mirror neurons is that they underlie the process of 'mind reading', or are at least a precursor to such a process.

Roughly speaking, 'mind reading' refers to the activity of representing to oneself the specific mental state of others, their goals, their perceptions, their beliefs and their expectations. Rizzolatti later commented, 'It is now agreed that all normal humans develop the capacity to represent the mental state of others'. They also believe that there are sufficient examples from the behaviour of nonhuman primates to constitute a strong argument supporting the hypothesis that they are also indeed endowed with cognitive abilities that cannot be easily dismissed as the results of simple stimulus response operant conditioning.

Within evolutionary psychology 'mind reading' has its intellectual roots in the research of a group in California led by Cosminides and Tooby. The main focus of research in evolutionary psychology is the question of how

humans came to be the apparently special animal we are today. In 1992 Tooby and Cosminedes defined evolutionary psychology as 'psychology informed by the fact that the inherited structure of the human mind is a product of evolutionary processes'. As far back as 1978, Premack and Woodruff had described animals who had the ability to understand the mind of another as possessing a 'theory of mind'. According to two of the leaders in the field Andrew Whiten and Richard Byrne, 'Having a theory of mind or being able to mind-read concerns the ability of an individual to respond differentially, according to assumptions about the beliefs and desires of another individual, rather than in direct response to the other's overt behaviour'.

One of the main contentions in evolutionary psychology is that any straightforward separation between cognitive and social capacities is likely to be unsatisfactory. The unprecedented complexity of human beings as compared to monkeys and great apes has come about precisely because these two domains are integrated in mutually reinforcing ways. Of relevance for our discussions is whether all this has any implications for our understanding of what constitutes human uniqueness. It warns us against seizing upon 'mind reading' as a uniquely human capacity. In also flags up for us the need to think carefully when focusing on the capacity for relationships as a key feature, if not *the* key feature, in defining what some have called 'soulishness'. The capacity for social relationships is itself, according to evolutionary theory, an evolved capacity, but one that may well have taken a quantum leap when combined with cognitive ability to equip homo sapiens with capacities and achievements so clearly different from those of our nearest, nonhuman primate relatives.

In our discussions I shall offer suggestions about how some of the discoveries of evolutionary psychologists may give a fresh prompt, and perhaps suggest a rethink, of claims that the capacity for moral agency and moral behaviour is a uniquely human capacity.

Some Issues at the Interface of Portraits of Human Nature from Neuropsychology and Evolutionary Psychology and Traditional and Widely Held Beliefs About Human Nature

Within mainline Catholic and Protestant traditions there are repeated and strong affirmations about belief in an immaterial and immortal soul. The scientific evidence reviewed suggests, I believe, that it is a distortion of reality to say that accounts given in mental categories, and accounts given in neural categories, are competitors, rather they should be seen as com-

plementary descriptions. It is therefore wrong to say that 'nothing but' the one or 'nothing but' the other will suffice. There is an intrinsic duality about the reality we have to deal with, but that does not need to be seen as duality of substances. Perhaps the evidence from neuroscience is encouraging us to consider reinterpreting some of the traditional ancient texts and to recognise what an increasing number of Biblical scholars have been telling us recently, namely, that we should return to a more holistic view of the human person. If the belief in the possession of an immaterial soul needs to be reconsidered so also do several other ways in which, historically, the assertion that humans are made in the image of God has been portrayed. For example, the view that the *imago dei* is possessing a unique capacity to reason. But then what do we make of the evidence of a theory of mind in chimpanzees and other nonhuman primates. The variety of complex reasoning tasks they perform would make such a view difficult to defend unless one continually changes the definition of what is meant by reasoning. Or again we may remember the view advocated by the North American theologian Jonathan Edwards that the capacity for moral behaviour and moral agency is part of what it means to be made in the image of God. How do such claims stand today and in the light of developments in evolutionary psychology? Behaviour which we should regard as moral behaviour, self-giving and self-limiting behaviour, if we saw it in our fellow humans is well-documented in nonhuman primates.

Other theologians, notably in the Orthodox tradition, have underlined the capacity for personal relatedness as a key feature of what it means for humans to be made in the image of God. The mirror neuron story makes it clear that our capacity for personal relatedness to a degree depends upon the intactness of our neural substrates and it is clear that these we share with the nonhuman primates. The mirror neurons were discovered in monkeys.

Perhaps we should do better to heed the advice of a contemporary New Testament scholar who wrote, 'The image is not located in any of these (possession of the soul, etc) but in our human vocation, given and enabled by God, to relate to God as God's partner in covenant. To join in companionship of the human family and in relation to the whole cosmos in ways that reflect the covenant love of God. This is realised and modelled supremely in Jesus Christ'.