

RAISING CONSCIOUSNESS ABOUT OUR COGNITIVE CHALLENGES

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States of cognitive impairment, particularly dementia of the Alzheimer type, offer opportunities to explore the interfaces between brain and mind. Consciousness enters the individual clinical and social conversations about dementia early in many different and critical ways. Clinically, the differential diagnosis of cognitive impairment requires consideration of clarity and level of consciousness. Does the patient have an acute confusional state (delirium) manifest by clouded consciousness or a progressive chronic condition (dementia)? Answering such questions accurately can actually lead to life-saving interventions (for example, glucose administration for hypoglycaemia). Scientifically, researchers are trying to identify the precise neural mechanisms involved in maintaining consciousness, even down to specific receptor sub-types. Culturally, creating social awareness of the challenges of dementia and having people, including those with dementia, frame the problems appropriately are key issues. All of these levels of analysis from the micro to the macro have both a neuroscientific basis and a cultural foundation – the challenge of qualia arise in interactions among molecules and among minds.

Staying with the clinical level, which motivates our exploration of the consciousness / dementia interface, we see much variability in the conditions that cause dementia.¹ Alzheimer's is said to be the most

1 Whitehouse et al. 2000; Whitehouse and George 2008; Ballenger et al. 2009.

common cause of dementia but is itself quite variable in its biological and clinical manifestations. It also overlaps with forms of Parkinsonism, which brings attention to slowness of cognitive (bradyphrenia) and motor activity and to fluctuations in level of lucidity as in Lewy Body Dementia. Frontal Lobe Dementia, which is characterised by deficits in executive functions (planning, motivation, judgement), explicitly brings focus on attention mechanisms and arousal / apathy. What then do we mean by ‘consciousness’ in the context of scientific, personal and social concerns about the epidemic of dementia created in part by the aging of the world’s population?

Raising Consciousness

Consciousness brings forth itself and in the process resists simple definition. To be aware and think of the word ‘consciousness’, we need to be conscious ourselves. To imagine the word in our minds as a set of thirteen letters, to repeat its phonological form in our mind’s ear, or to utter the word in conversation, we are aware of the word itself. From the neuroscientific perspective, various neurons, synapses, transmitters and receptors need to be activated to think of the concept. From a cognitive-science perspective, networks of lexical entries are activated in ways that depend on the context of the thought in which the word ‘consciousness’ appears. From a cultural perspective, consciousness as a word and a concept emerges as an idiom imbued with specific meanings and connotations in distinct cultural and local settings. Essential to being conscious is being awake and aroused and being selective in our attention and awareness.

Metaphors are essential ways that we create and manipulate meaning and, through that process, the world around us.² They employ language to compare two domains of human experience and hence enrich understanding of one domain with the other. Geometric metaphors that associate less physical ideas with the geometry of body and space are especially common and powerful. Consciousness as a word and concept can be geometrically modified and manipulated. We can go deeper into it (subconscious), divide it (split consciousness), share it (collective consciousness), and go beneath it (perhaps unconscious). Moreover, consciousness can be viewed as a discreet state (conscious or non-conscious) or as a degree or level. Clinically consciousness can

2 Bateson 1972

range from alert to stuporous to comatose, for example. In mystical and spiritual traditions, consciousness can refer to degrees of ‘elevated’ consciousness or enlightenment.

In this paper, I address cognitive neuroscientific issues with regards to raising consciousness. When a group of people are said to be ignoring the ‘big picture’, concerning a complex problem, we say that we must ‘raise their consciousness’. In other words, we must change their level of consciousness in order to enhance it, so they can see the challenge in a broader context. U.S. President Dwight Eisenhower famously said that he often found making a problem ‘bigger’ helped find the solution. Such an act expanded his consciousness to a richer historical or cultural level and, in that way, created an impetus for his deeper thinking about a given issue, integrating variables otherwise ignored that could influence a good solution. An elevated level of consciousness might relate to not seeing the world categorically (black and white) but rather as a continuum (shades of grey). Perhaps a solution might lie in understanding process, not so much structure, or in attending to one part of the problem more than another. When do we focus on the abstract and whole picture, and when on the concrete and particular? When does a part at one level become the whole at another? Can cleverly framing an issue guide us towards more constructive approaches?

Raising consciousness fits well into the general area of study in cognitive neuroscience called ‘enhancement technologies’, which can improve cognition or foster ethical development. In the years following the *Decade of the Brain* (1990s), which celebrated the power of neuroscience, we are attending to the possibilities of both neuro and cognitive enhancement. For example, drugs that act on the cholinergic mechanism are used to treat person with dementia, but were demonstrated in preliminary work that pilots flying in flight simulators land and handle emergencies better when taking a cholinesterase inhibitor.³ Could more specific drugs (like selective nicotinic agonists as discussed below) be developed that have an appropriate risk benefit ratio for use in ‘normal’ people? Is being aroused and attending to the most critical aspects of the environment so central to executive function (and even wisdom) that we could develop drugs that would actually help us think more broadly and deeply about complex social and environmental challenges?

3 Yesavage et al. 2002.

Indeed this focus on thinking and valuing better is just in time (and hopefully not too late) for humankind. For the state of the world in this new millennium of global aging and climate change needs the best intellectual and moral imagination we can muster. The state of social justice between the haves and have-nots, and the global climate crisis, create a need for enhanced solutions to social challenges. Much of this crisis is driven by unsustainable population growth. A complexity of this growth is the imbalance between the number of children and young adults, and their elders, who often require most assistance, particularly the growing number of older persons with dementia.

Some might argue that raising consciousness has been an important process throughout the history of our species, and I would agree. Concepts like the ‘Enlightenment’, ‘Industrial Revolution’ and ‘Postmodernism’ are used to label major periods of history and are considered descriptions of the change in those periods’ culturally dominant ways of thinking. Given the huge challenges to species viability evident in the world today, from population growth to environmental degradation, perhaps one can argue that our time is special in history too.

Perhaps one could also argue that addressing global climate change is a political issue, one not appropriate for a scientific journal on the brain mechanisms of consciousness. Like a frog in a slowly heating pot, we must attend to the perhaps unconsciously perceived changes in our environment at first, in order to avoid a slow death. When Professor Jane Lubchenko (an environmental scientist at Oregon State University) was president of the American Association for the Advancement of Science in 1994, she suggested that all scientists should consider devoting 10 per cent of their efforts to the challenges of climate change. All science is potentially relevant to addressing the problems of global weirding and warming, and the situation has gotten worse in the ensuing decades. Sure, cognitive neuroscience has its contribution to make to enhance our thinking about these issues, and this article is itself an effort to raise the consciousness of its readers to this huge threat to life on our planet.

How much can science contribute to mental enhancement?⁴ Neuroscience offers the possibility of biological interventions to improve the brain through drugs, as well as other biological products, such as growth factors, gene therapy, or perhaps stem or genetically

4 Whitehouse et al. 1997

modified cell transplants. Research on drugs that act on adrenergic and cholinergic mechanisms suggests that attention and memory can be improved to modest degrees through such approaches. Stimulants can keep people awake and affect attention. As mentioned before, cholinesterase inhibitors may have some small positive effects in some persons with and without clinical memory problems. Serotonin reuptake blockers may improve mood, even in those with subclinical depression. LSD opens even broader and more controversial vistas of possible enhancement scenarios as psychosis-producing drugs might be viewed as expanding mental powers through psychedelic therapies.

In recent work, we have been exploring whether clinical states might actually not impair but rather release cognitive abilities that are suppressed in people without such lesions. For example, people with damage to the frontal lobes have impaired ‘self-awareness’ that in turn may alter so-called psi abilities.⁵ Psi is controversial but is said to involve obtaining or transmitting information without the use of usual senses. Given the other unknown phenomenon in the universe, like quantal entanglement, multiverse theories, and dark matter and energy, we should keep an open mind about cognitive abilities that we currently do not understand.

Dementia Revisited

Understandably, much of the work on cognitive and emotional enhancement has been focused on the treatment of clinical conditions, such as dementia. So-called Alzheimer’s disease is treated with drugs that enhance cholinergic and alter-glutamatergic function to improve cognition and/or mood improving drugs to treat the associated depression. To illustrate this approach, we will focus on cholinergic mechanisms in Alzheimer’s and related conditions.⁶ Synaptic dysfunction and eventual neuronal death in the cholinergic-basal forebrain underlies the loss of cholinergic markers in cortex and hippocampus that correlates with the level of cognitive impairment. Acetylcholine stimulates a variety of receptor subtypes broadly defined as muscarinic and nicotinic in nature. Blocking these receptors can cause cognitive impairment. Stimulating them can improve cognition in some animal models and humans suffering from some forms of dementia. Most recent efforts to

5 Freedman et al. [submitted].

6 Whitehouse 2003

treat cognitive impairment have focused on nicotinic receptors and even on specific subtypes, especially alpha4 beta2. Nicotinic receptors are composed of several different components labelled with Greek letters that themselves can exist in different types labelled with numbers. Martin Sarter, as an example of one theorist, believes that these receptors modulate the efficiency of detection processes and cognitive-processing mode shifts and hence may affect attention mechanisms that may underlie consciousness.⁷

Alzheimer's disease (AD) is a century-old term that is in fact quite controversial.⁸ The genetic, biological, clinical and cultural variations in AD suggest strongly that it is not one condition and is best thought of as an age-related syndrome or family of disorders rather than a specific singular disease entity. Moreover, despite decades of research, no clear qualitative distinction between Alzheimer's and normal (admittedly severe) brain aging has been found. Clinicians (including the author who contributed to many of these labels before his own consciousness and conscience were enhanced) suffer from semantic ataxia as they stagger from one category to another and extend the boundaries of pathology with acronyms and labels, such as AAMI (Aging Associated Memory Impairment), ARCD (Aging Related Cognitive Decline), and MCI (Mild Cognitive Impairment).⁹ In addition, the overlap among various dementias, especially Alzheimer's, Parkinson's and vascular dementia, suggest multiple interacting pathological processes that frequently overlap with neurobiological processes, and which affect everyone as they age to one degree or another.

It is time to recognize that concepts such as dementia and Alzheimer's deserve more careful scrutiny as to how we can effectively address them in our individual and social lives. Efforts to extend the boundaries of pathology even further through such concepts as MCI and the latest concept pre- or eMCI (early) need to be challenged. These medicalizing labels are justified by the pressure for early recognition, so that as yet unavailable and perhaps unimaginable therapeutic agents can fix the problems of brain aging. The powers of fame and fortune (the prophet and profit motives of individual scientists and pharmaceutical

7 Sarter 2009

8 Whitehouse and George 2008.

9 Crooke et al. 1986

companies) have distorted our biological science and its application to improve health.

Towards a Deeper Neuroethics

Bioethics has emerged into our clinical and scientific lives at a critical moment to potentially challenge the dominant ways of applying science in the world, but it has failed.¹⁰ Bioethics has been co-opted by medicine so that it expends most of its energies justifying research practices and exploring limited views of health, such as genetic medicine (while largely ignoring environmental health issues). The ethics of bioethics has itself been challenged. Neuroethics, the latest branch of bioethics to emerge, is a case in point. Neuroethicists are enamoured with technologies to read (fMRI and EEG) and enhance (drugs and deep-brain stimulation) minds. Yet their moral scope is limited. Do they adequately attend to conflicts of interest between industry and scientists or even bioethicists? Do they wonder why we still damage children's brains with neurotoxins in our environment? Do they contemplate the profundity of their own actions?

Biochemist Van Potter coined the term 'bioethics' in 1970 and then refined it into 'deep bioethics' with me. We were inspired by deep ecologists like Arne Naess. With this modifier, 'deep', we asked people to explore their fundamental connections to nature (including other human beings and other living creatures). We are evolved and evolving life forms that have thrived to this point in the history of our planet through our competitive advantages in social learning. Such a deep ecological orientation can help us create a sustainable international, intergenerational and even interspecies ethics; in fact, it may be the only perspective that will do so. Hence, vertically enhancing 'consciousness' in the metaphorical sense involves not only raising it but also deepening it.

Ironically, science may offer more hope to improving health through information technology than biomedical technology. Many people are already heavily dependent of digital devices or online social networks to maintain their memories and even enhance them. New multimedia learning technologies, virtual realities, robots, and smart devices, phones, homes and cars can help us all function better in daily life. Such information technologies are also likely to improve

10 Potter and Whitehouse 1998

the lives of those with cognitive impairments, if we can bring digital approaches to bear on this problem and move beyond too narrow a focus on biologic solutions to problems that are framed as medical but have other dimensions as well.

A more realistic view of the pathologies of brain aging would consider more than just reductionistic molecular approaches and focus on more than just the elderly. Lifespan and ecological perspectives on brain health are more likely to lead to effective interventions than drugs. Damage done to younger individuals, such as lead poisoning or head injuries, reduces their cognitive reserve and makes it more likely for a frank dementia to appear when they are older. The solution to so-called Alzheimer's disease is not likely based on single molecules and genes but instead on a recognition that environment plays an important role in maintaining brain health throughout life. Enhancing learning about brain aging (through information technology and ever-increasing online social networks for example) will not only improve health and quality of life but might directly help keep neurons themselves more viable.

As global warming intensifies and the resulting dramatic changes in weather patterns occur, more cognitive impairment will likely relate to the lack of availability of adequate water and food supplies, expanded distribution of infectious diseases, increased exposures to toxins and pollution, intensified heat waves, and greater numbers of head injuries due to warfare and ecological disasters. How can we enhance the executive functions of our leadership in the world to realize that our very species is threatened by these global changes and our reactions to them? How can we all become better leaders ourselves in facing this terrifying challenge of possible species extinction? Yes, we are not only causing other species to go extinct but are ourselves an endangered species.

Never has there been a more necessary time to raise our consciousness, to enhance our thought process, and to expand our moral imaginations. To raise consciousness implies bringing issues into the collective mind. It brings forth problems or topics to which we are not attending adequately. Through stories, images and action, we stir the noosphere (and its material digital manifestation, the blogosphere) to action.

The principal means by which this will occur is through education. Yet many are concerned about the state of the school systems that we have entrusted to educate our children, the university systems to teach our young adults, and the missed opportunities to support older learners. Classroom-based, age segregated, and disciplinary oriented learning approaches are not meeting the needs of a new generation of learners. Lifelong, developmentally appropriate, experiential learning in service of the social and natural community can provide more effective pedagogical approaches. This rich form of social-learning engagement becomes the ultimate tool for raising consciousness and enhancing cognitive and moral skills.

The Intergenerational School as Enhancement

One such enhancement technology is *The Intergenerational School*, which was founded ten-years ago by my wife, myself and others.¹¹ In this school, learners of all ages work to create a community of respect based on loving relationships in a common commitment to the community and the future. Reading mentoring, multi-age computer classrooms, environment-based curriculum, and regular nursing home partnerships are a few of its signature programs. Evidence suggests that this kind of a learning environment improves the education and quality of life of both the children and the older adults. Studies suggest that even patients with mild to moderate dementia can respond to such an educational community.

Increasingly, the school is focusing on understanding natural systems, such as watersheds, and appreciating the importance of local foods to the health of the community. Digital technologies such as computer-ecosystem modelling and social networks like digital cities serve as pedagogical tools. So too we are realizing that everyday aesthetics are essential to our consciousness-raising. Enhancing our appreciation of the beauty in ourselves, others and the natural world may be more critical to survival than truth and goodness.

Environmental ethicists like Aldo Leopold and deep ecologists like Arne Naess challenge us to ‘think like mountains.’ Following this metaphor, we must think in broad-based, long-term and aspiring ways about responsibilities for the future. Such an intergenerational ethics

11 Whitehouse et al. 2000; Wykle et al. 2004.

must be based on more feminine perspectives, such as those of Rachel Carson, which I captured in the phrase that we must learn to ‘feel like water’ (flowing and changing bodies of powerful water like rivers). Indeed, water wears down mountains, and, we ourselves, are water-composed and water-dependent organisms.

Ultimately, we must raise consciousness and create collective wisdom as we move into the 21st century. We should recognize the seeds of wisdom in all of us, and help each other to fertilize those seeds and allow life to flourish. Such wisdom has at its heart recognition of limits – the limits of words and concepts, the limits of science, and the limits of our own human capabilities. Rethinking Alzheimer’s disease is a key point of leverage and a critical domain of consciousness-raising. If we can see how those two variably used and perhaps even inaccurate words lead to unrealistic expectations and false hopes and constrain intergenerational solidarity, we have a case study for how deepening consciousness can emancipate us from what Nietzsche called the ‘worn-out metaphors which have become powerless to affect the senses’. Indeed, science cannot solve any problem by simply enhancing its political power and financing. In time, will we recognize that true hope lies in the recognition of the limits of life and the importance of community in addressing suffering and flourishing, especially of those with cognitive challenges.

Wisdom to Survive

A fundamental aspect of wisdom is the recognition of limits – in our own cognitive abilities and the constraints imposed by our planet and its ecosystems. Human beings in general are demonstrating that they cannot adequately address basic (food and sewage) and instrumental (communication and transportation) activities of daily living. Our executive functions and abilities to limit social disinhibition (war and other violence that we do to each other) are weak.

Perhaps, rather than emphasize our hubris by focusing on the superior aspects of our evolved brain (the superficially-located association cortices), we should emphasise what we share with other ‘lower’ species. Perhaps, in those older, more deeply located parts of our brains that are more in common with other animals, we will find some of the unconscious schemata we need to bring forth and better

integrate with consciousness. Perhaps located there are the survival values that say: Do not foul one's own nest or do not posture aggression but instead prevent violence and co-species killing. We are part of a continuum of consciousness that exists in many species, some of which have survived much longer than *Homo sapiens*.

We also share with all those who are clinically labelled as 'demented' a place of the spectrum of human consciousness. One might even say that our own thinking about brain aging is 'demented' and suffers from hardening of the categories (diagnostic labels). Our drive to medicalize aging is a kind of collective foolishness. With both profound irony and truth, we must recognize our own collective-species lack of wisdom (i.e. 'dementia') before we can achieve the knowledge and behaviours necessary to survive and thrive in these increasingly challenging times.

Finally, as social creatures, our consciousness often emerges in collaboration with others. The further evolution of individual consciousness depends on the work we do in schools, health-care institutions, spiritual places, and other organizations to enhance their capabilities to grow in a more complex world.¹²

Conclusion

Learning to recognize and adapt to the limits of our language and our science is a form of consciousness-raising essential to developing appropriate social responses to the challenges the future will bring. Having realistic hopes for scientific approaches to understanding and enhancing consciousness, as well as an appreciation for cognitive social science, should be part of our efforts to gain collective wisdom and promote our survival and flourishing as a species

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12 Geer and Wei 2017.

founded, with his wife, Catherine, The Intergenerational School, a unique public multi-age community school (www.tisonline.org), of which he is president. Peter is active in visual arts, dance and music organizations, including the National Center for Creative Aging and Dance Exchange. A part of the reimagine aging movement., he is co-author of *The Myth of Alzheimer's: What you Aren't Being Told about Today's most Dreaded Diagnosis* (www.themythofalzheimers.com), along with hundreds of academic papers and book chapters. A futurist with a deep interest in historical roots, he occasionally performs as Tree Doctor, a metaphorical creature who educates humans about being healthy from the perspective of a tree in a forest. He may be reached at <peter.whitehouse@case.edu>.

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