Neurosciences and philosophy: what is new in the 21st century?

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ABSTRACT

This article aims to clarify certain questions currently being debated around the intersection between neuroscience and philosophy. Four areas of the subject are addressed: a) neuromania: the problem of reducing philosophy to computational neuroscience and its abuses in the form of the naturalistic fallacy; b) neuroethics: conditions of possibility of humanisation and hope as a horizon for a subjective morality; c) posthumanism: the default mode network as a substrate of the self, and the postmodernist dissolution of the concept of self; and d) qualia: the problem of consciousness, its physical substrate in psychons, and the proposal of the "brains-mind problem". The contributions of several recent philosophers, including Habermas, Ricoeur, Cortina, Varela, and Bunge, are reviewed. It is proposed that 21st-century neuroscience may contribute to a better understanding of the neurological processes underlying the creation of a common *logos* through better understanding of the conditions of possibility of the emergence of mental properties in "minding matter". Consciousness is an important indicator, but not the only indicator, of this kind of ontological emergence. This will contribute to the prevention, by philosophical anthropology, of two *aporias* of subjectivity: alienation and suicide, both of individuals and of humans as a species.

KEYWORDS

Philosophy, neuroscience, neuroethics, brain, mind, consciousness

Introduction

The neurosciences and philosophy have a shared interest in certain problems, such as the problem of consciousness or the issue of purposive behaviour. This intersection has been addressed by the philosophy of psychiatry, among other disciplines. The Oxford University Press has published a range of material on the subject, exemplified by its *Textbook of philosophy and psychiatry.*[1] We may be justified, therefore, in reviewing the intersections of these disciplines within a narrower timeframe. There are two grounds for criticising this approach, however: firstly, we must examine the definitions of these disciplines (why "neurosciences and philosophy" and not "neuroscience and philosophies"?); and secondly, we must consider whether these disciplines really do share a field of interest or whether, on the contrary, they address entirely separate issues, concealed behind the polysemy of terms like "mind" or "consciousness", derived from popular psychology.

Any scientific discipline, because it deals in facts, must be considered as a unified entity, as true facts do not allow for mutual contradiction. Furthermore, science itself appeals to an ideology of the "unity of science", whereby science would be the set of proven facts, or in other words, the set of truths. We will therefore use the word "neuroscience", in the singular, from here on. The prefix "neuro-" refers to the study of the section of reality comprising the set of nervous systems.

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Philosophy, on the other hand, is better expressed as a plurality. If we take philosophy to mean the path towards the truth, then it is fundamentally a method. Plato embraces dialectics to the extent that in *The Republic* (VII, 533d),[2] Socrates asserts that "only the dialectical way of inquiry proceeds in this direction, destroying the hypotheses, to the beginning itself in order to make it secure". Philosophical methods have always been diverse, before and since Plato. At the risk of oversimplifying the question, contemporary Western philosophical traditions can be grouped into four families: Anglo-Saxon analytical philosophy; continental philosophy, influenced by phenomenology, hermeneutics, and postmodernist poststructuralism; the critical theory of the Frankfurt School; and materialist philosophy.[3,4]

This narrative review aims to clarify certain questions currently being debated around the intersection between neuroscience and these four philosophical traditions. The review is limited loosely to the 21st century, taking into account the proposal of the "short 20th century", ending with the collapse of the Soviet Union in late 1991[5] and coinciding with the Decade of the Brain. Selecting which questions to investigate is of greater difficulty: is the mind real, or is it a cultural construct? Is mind the same thing for a neuroscientist as it is for a philosopher? Should the philosophical mind be reduced to the neuroscientific mind? Is it the place of philosophy to set the agenda for neuroscientific investigation? Furthermore, how do a scientist's mind and the dominant discourse of her community influence her efforts to carry out "objective" neuroscientific research? Is it even possible to speak objectively about subjectivity?

We will briefly address these questions and others from four different perspectives: 1) neuromania, 2) neuroethics, 3) posthumanism, and 4) qualia. Other approaches could have been chosen; it is hoped that this one may illustrate, even roughly, the 21st-century synergy between philosophical constructs and neuroscientific fact. The aim of this is to contribute to the use in neuroscience, and particularly in clinical neuroscience, of models with a grounding in ontology, semantics, ethics, and epistemology, in order to meaningfully interpret the overwhelming deluge of information being produced by neuroscience. Finally, scientific communication does not escape the hermeneutic circle, which is nonetheless influenced by an echo of probabilism in the scientific speech acts reflecting a silent reality.

Development

Neuromania?

García-Albea[6] has critiqued the current proliferation of the prefix "neuro-", compiling a list of 30 "neuro-Xes", from neuroculture to neuromarketing and neurolinguistics. In his 2011 book *Aping mankind. Neuromania, Darwinitis and the misrepresentation of humanity*[7], Raymond Tallis proposes the term "neuromaniac" to describe proponents of the idea that human behaviour can be explained exhaustively by neuroscience. Tallis believes that neuromaniacs, together with sufferers of "Darwinitis" (who explain human behaviour as an evolutionary adaptation), may be promoting excessive theoretical simplification, with morally and politically dangerous consequences. Are we no more than our brains?

An important issue here is the reduction of epistemology to neuroscience. The current reductionist debate began in 1986, with the analytical philosopher Patricia Churchland's book *Neurophilosophy: toward a unified science of the mind-brain*.[8] Churchland proposes a reduction of philosophy of mind to neuroscience, modelled after the work of Pellionisz and Llinás, which enabled the geometrisation of the structure and function of the cerebellum as a tensor network. According to this model, mental representations would be different states of the system's phase space, and cerebral computation would be no more than the series of coordinate transformations between said phase spaces.[8(p426)] From this position of reductionist materialism, Churchland defends a distributed connectionist model of the brain, ruling out the existence of hypothetical "grandmother cells" with the capacity to react to specific stimuli (see Quiroga's[9] article for a review of the problem of gnostic cells or "grandmother cells"). Neurophilosophy understands science and philosophy as paired, mutually enriching disciplines. The concept of "metascience" (by definition always in the singular) would be the asymptotic extreme where the two disciplines become one in the mind of the researcher.[10]

This reductionist approach has focused on developing computational models. There is broad consensus that these should not be formalised in lineal mathematical terms; rather, they should model nonlinear complex systems (Gabbiani and Cox's *Mathematics for*

neuroscientists[11] is a good guide). Computational neuroscience and systems neuroscience[12] are the dominant paradigms in cognitive neuroscience today.[13] Between the biological (or implementational) and the phenomenological (or symbolic mental) levels of analysis, we are witnessing the development of the subsymbolic mental (or computational) level of analysis (see Bermúdez[14] and Dayan et al.[15] for an introduction to computational models).

The clinical usefulness of clarifying the philosophical issue of neuronal reductionism is perhaps most evident in the context of attention-deficit/hyperactivity disorder (ADHD), which has become a highly controversial issue. Supported by the prestige of *Nature Neuroscience*, defenders of neuroscience could employ Sigman's[16] arguments for evidence-based education. The use of psychostimulants to treat children with ADHD would then simply be derived from the ethical duty to mitigate the disadvantage associated with a medical condition. Critical theorists opposing neuromania might refer to Jürgen Habermas's 1968 critique of technocratic discourse as an instrument of capitalism, in his book *Technology and science as ideology*.[17] Concerning clinical neuroscience, followers of the Frankfurt School would argue that the monolithic discourse of scientism, the DSM classifications in use, opinion leaders in the pay of "Big Pharma", and the invention of new diseases are no more than techniques employed by capitalist power. Neither has schizophrenia escaped postmodernist critique.[18] Philosophical analysis of the problem of neuromania raises several epistemological questions to which computational neuroscience can now provide an answer. Other questions invite us to reflect on arguments that resolve the "naturalistic fallacy", made in the 18th century by David Hume and in the 20th by Karl-Otto Apel and George Moore. Dussel[19] analyses these arguments in detail. Readers interested in the naturalistic fallacy are also recommended to read Javier Muguerza's "'Es' y 'debe' (En torno a la lógica de la falacia naturalista)" (" 'Is' and 'ought' [On the logic of the naturalistic fallacy]"), the second chapter of his book *La razón sin esperanza* (Reason without hope),[20] where he explains that:

> the naturalist fallacy consists in attempting to derive conclusions expressed in evaluative language (the language of value judgements or norms) from premises expressed in descriptive language (the language of judgements of fact).[20(p80)]

It would appear to be impossible to approach the important issue of morality from a solely computational standpoint. Computational neuroscience takes cerebral processes as a point of reference, but morality is social in nature. The regulation of interpersonal conduct is beyond the reach of the computer metaphor, giving us grounds to wonder whether a naturalist reduction of ethics may also be possible.

Neuroethics: the conditions of possibility of humanisation

In 2002, the first conference on neuroethics was organised by the Dana Foundation, Stanford University's Center for Biomedical Ethics, and the University of California.[21] The event was followed by several publications, including *Neuroética. Cuando la materia se despierta* (Neuroethics. When matter awakens), by the philosopher Kathinka Evers,[22] and *The neuroscience of freedom and creativity: our predictive brain*, by the neuroscientist Joaquín M. Fuster.[23]

Adela Cortina[24] draws a distinction between the ethics of neuroscience and the neuroscience of ethics. In the first, neuroethics would simply be a branch of bioethics. The second viewpoint would be of greater philosophical interest; according to Cortina:

> Evidently, if the neuroscience of ethics has an impact on our understanding of human agency, then it is not merely another branch of applied ethics; rather, it must be its central axis, as it sheds light on issues as complex as liberty, choice, rationality, and agency itself. The neuroscience of ethics is therefore central to our political, moral, and social aspirations.[24]

Alluding to the naturalistic fallacy, Cortina asks: "can we truly make the step from the cerebral 'is' to the moral 'ought'?" Her article discusses certain common inexactitudes of neuroethical experimentation, concluding that neuroscience, together with other scientific disciplines, reveals the human propensity for cooperation, but does not constitute the foundation for a universal ethics.

By demonstrating that the tendency towards cooperation is a human universal, neuroethics supports Aranguren's proposal that morality brings structure to humankind.[25] However, hominisation is not the same thing as humanisation. María Zambrano maintains that an animal is "born in a moment" and then adapts, while

humans "are never fully born"; rather, hope leads them to seek the completion of the project they aspire to become: "hope is the substance of our lives; it is what lies behind all else."[26(p112)]

It would appear, then, that neuroethics' promise to create a universal ethics only goes as far as hominisation, but cannot reach the level of humanisation. In other words, neuroethics can reveal the conditions of possibility for moral conduct, but not the specific course to be followed: cerebral integrity would be a necessary but not a sufficient condition for free, intelligible moral conduct. Henry Ey sensed this in his description of mental illness as a "pathology of freedom", noting that freedom has been considered a necessary condition for morality since Kant. In the light of the approaches summarised above, it is clear that science, including neuroethics, appears to remain axiologically neutral: it can say little on moral values. Moral philosophy, then, continues to be independent of science. Man essentially remains open, hoping for emancipation, whether as a member of a dialoguing community[27] or as a dissident subject, attracted to, like Javier Muguerza, the irrationality of hope.[28] Ernst Bloch best explains the function of hope:

> Yet Heraclitus says, 'Whoever does not hope for the unexpected will not find it.' This should be enough to invoke the call to action, according to which human existence —in the transcendental sense upon which this existence is founded— means that which transgresses or goes beyond.[29(p210)]

Without analysing in detail this opening-up of human nature, we should note at least the potential of aesthetics as a treatment framework. Let us consider, for example, art therapy or music therapy from the perspective of Ortega y Gasset's conception of man as a "fantastic animal"[30], or María Zambrano's[31] application of poetic reason to psychotherapy. Both examples could serve as a reference point for future neuroaesthetics research.[32]

Neuroethics does not recognise the ultimate questions of ethics: what is good? What is just? How must we behave? Understanding of the cerebral processes studied by neuroethics, as a necessary condition for ethics, could help explain amoral behaviour (if we accept that morality is the structure underpinning the human condition, amorality could be classified as subhuman and immorality as inhuman): since the case of Phineas Gage, numerous examples have been published. A possible explanation could be how the pathological suppression of structures related to moral control is accompanied by the disinhibition of "subhuman" conduct (impulsive aggression, for example). However, as this is not a sufficient condition, explanations for good, justice, and duty should be sought elsewhere, in the subjective understanding of the motives of human behaviour, the conscious self as a moral subject.

Posthumanism?

The conscious self as a moral subject is a concept deeply rooted in the philosophy of Descartes and Kant, and is essential for us to understand the Enlightenment humanism that gave way to the modern era. Some believe this ideal to have disintegrated after May 1968, while others consider it still to be valid. Philosophical anthropology matured over the course of the 20th century, with pretensions of becoming a first philosophy with the subject as the source of its argumentation. The latter third of the 20th century saw the convergence of the analytical tradition of the "self", rooted in language, and the concept of the transcendental, phenomenological subject, rooted in experience. This led to the idea of the subject as the author of speech acts and the zero-point of the self anchored both to a body and to the world.

The default mode network (DMN) has become the main candidate considered for the material correlate of the concept of self. A complete review of the subject[33] postulates that the main function of the DMN is to allow flexible, self-relevant mental explorations (simulations), a way of predicting and evaluating the results of a situation before it takes place. Its role in tasks involving autobiographical memory, prospection, mentalisation, and moral decision-making supports the suggestion that DMN is the biological substrate of the self. The psychological and philosophical construct of subjectivity is characterised by temporality, self-awareness, and morality. Drawing on arguments from computational neuroscience and an exhaustive review of Freud's oeuvre, it has also been proposed that the DMN may also be the substrate of the psychoanalytical concept of "ego".[34] In his theoretical framework for neuropsychoanalysis, Northoff[35] performs a detailed analysis of this possibility, studying object relations from the perspective of neuroscience. Since Kandel[36], numerous works have sought meeting-points between neuroscience and

psychoanalysis; see, for example, Ansermet and Magistretti's[37] book approaching neuroplasticity from a Lacanian perspective. We will not discuss in detail the vast body of literature on mentalisation and its relation to the DMN, Buddhist meditation, and the practice of "mindfulness". Santachita and Vargas[38] can be consulted for a critical review of these issues from a philosophical perspective.

However, while the first decade of the 21st century saw neuroscience begin to address the neuronal substrate of the self, the 1990s saw philosophy beginning to abandon the subject. In 1990, Paul Ricoeur published *Soi-même comme un autre*,[39] in which he developed his thesis of the "broken *cogito*". The theory, revisiting Nietzsche, posits the self as merely an illusion of the Cartesian *cogito*: the death of God is joined by the death of the self and of the modern concept of subject. This was anticipated by Barthes, with his death of the author, and later by French poststructuralism, led by Foucault and Derrida.

In the postmodern era, the modern concept of self no longer represents the image of what is human. The "Sloterdijk-Habermas controversy" in Germany in 1999 led to the consolidation of posthumanism[40] as the contemporary image of humanity. This debate, which has not escaped political interpretation, began with a new eugenics debate centred around biotechnology and cybernetics. Posthumanism posits that classic humanistic education as the ideal for progress has been surpassed by scientific advancement, and that humankind could be improved by overtly technological means. And if the human body can be improved through technology, then the same appears to be true of the self. In our times, dominated by the use of social media, personal identity has acquired a hitherto unknown polymorphism: it is no longer a case simply of identifying a sameness linking the different selves anchored to a single body, but of joining this corporeal identity with the various virtual selves that make up the complex postmodern subject, which is increasingly expressed through virtual speech acts, less tied to the body. At the same time, however, the new "post-truth" appears to be travelling in the other direction, departing from cold reason in favour of unstable, emotional argument. This context, together with the real possibility of understanding identity through neurotechnology, has sparked a complex debate around the reinterpretation of human rights, no longer serviceable in the new posthuman world.[41]

Once mind and subjectivity are deconstructed, all that remains is consciousness, in the Cartesian sense. Perhaps neuroscience and philosophy can converge here, to tackle the hard problem of consciousness? Could we shed light on the ontology of qualia?

Qualia: the brain-mind problem

The Oxford Companion to Philosophy defines "qualia" as "the subjective qualities of conscious experience (plural of the Latin singular *quale*).[42] Qualia are indescribable experiences which refer to the secondary qualities of things, such as colour. They are prior to language and behave as shared semantic fields that are understood *a priori*, prior to any speech act. For example, the experience of the colour red cannot be defined; rather, familiarity is assumed before an object is described as being red. The problem of qualia is the main challenge for the various ontological models of mind tasked with explaining the nature of conscious experience.

If neuroscience is comfortable with studying mind, the same cannot be said of consciousness. After the cognitive revolution instigated by Howard Gardner in 1985,[43] artificial intelligence models gave rise to the computer metaphor in the study of cognitive processes. Later, the connectionist paradigm also accommodated for the mind (Blanco's[44] general history of neuroscience is recommended). However, conscious experience was not accepted as an object of neuroscientific study until nearly 20 years later, with the rediscovery of the phenomenology of Husserl and Merleau-Ponty. The words of Joaquín Fuster serve by way of example: "…phenomenology — the analysis of conciousness— is increasingly recognised as a useful method in cognitive science and, accordingly, in cognitive neuroscience".[45(p249)] The renewed interest in consciousness requires a robust handling of the brain-mind problem. Recommended literature on the subject includes the recent reviews by Goñi-Sáez[46] and Tirapu[47]; Gallagher and Zahavi's book *The phenomenological mind*[48]*;* and Damásio's books *Descartes' error*[49] and *Looking for Spinoza*,[50] which focus more on materialism and science outreach.

The embodied mind: cognitive science and human experience,[51] the 1991 book by Francisco J. Varela, Evan Thompson, and Eleanor Rosch, brings together the dynamic, non-linear study of conscious processes and the phenomenological and Buddhist

traditions under the umbrella of "enaction". Varela proposes neurophenomenology as a methodological solution to the hard problem of consciousness.[52-55] Neurophenomenology also allows for compatibility between the phenomenological tradition and connectionist computational models.[56] According to the neurophenomenological theory of enaction, object and subject are part of a single dynamic process; therefore, objectivity and subjectivity would be a single entity, as would epistemology and ontology. Theise[57] defends a similar, markedly holistic, approach based on self-organising complex systems and quantum mechanics. He proposes the existence of a substratum of fundamental awareness, a theory focusing on information over matter and action over agency. According to the fundamental awareness theory, qualia are not the "hard problem of consciousness"; in fact, they are the foundational elements of all existence. Similar holistic approaches to the issue of qualia are Chalmers'[58] panpsychofunctionalism and Velmans'[59] reflexive monism.

In this author's opinion, the emergentist materialism defended by Mario Bunge[60,61] is the best theoretical framework from which to approach the brain-mind problem from the perspective of neuroscience: Bunge's system is materialist, systematic, emergentist, realist, and scientific; all these properties are compatible with neuroscience. Bunge defines "emergence" as follows: "To say that P is an emergent property of systems of kind K is short for P is a global (or collective or non-distributive) property of a system of kind K, none of whose components or precursors possesses P".[62(p32)] In other words, emergentism deals with the properties belonging to systems but not to the elements making up said systems. According to Bunge, qualia are an emergent property of minding matter. Minding matter would be organised into psychons, which Bunge defines as plastic neuronal systems. Note that the concept "psychon" was originally proposed by Eccles,[63,64] although from a dualist perspective whereby the psychon is a mental element interacting with a neural counterpart, the "dendron".

Furthermore, the systemic nature of Bunge's model is particularly well-suited to the study of mental events emerging in cognitive systems made up of the brain and the world. Systemics facilitates heuristic continuity with the classic dynamic biological models proposed by Ludwig von Bertalanffy's general systems theory, and later by Humberto Maturana and Francisco Varela. Systemics is also coherent with the formation of brain-world systems such as that anticipated in the 19th century by Franz Brentano, who considered the mind to possess intentionality, an idea revisited by his disciple Husserl, and later by the phenomenological tradition. Similarly, in the mid-20th century, Viktor von Weizsäcker's philosophical anthropology described the "circle of form" (der Gestaltkreis), postulating the unity of perception and movement. More recently, Joaquín Fuster has made a similar appeal to this system, proposing the term "perception-action cycle".[65]

Conclusions

We have briefly reviewed some of the philosophical traditions and issues that are of interest to neuroscience. This article has discussed these subjects only superficially; a wealth of additional information and discussion can be found in the literature. This article has attempted to demonstrate the way in which philosophy appears, in some sense, to lead the way for new lines of enquiry in neuroscience. At times, neuroscience contributes theoretical or mathematical models, and even demonstrated fact, but at others its only result is the increasing noise of uninformative data.

Therefore, the epistemological problem of mind seems to be delegated to computational neuroscience models, and may be reduced to these models. The metascience born of the hybridisation of epistemology and computational neuroscience revives the Greek *logos*, with its triple sense of word, reason, and link. However, with posthumanism, the path of subjectivity appears to dissolve due to the loss of a semantic reference for the concept of "self". Similarly, it seems possible that the path of neuroethics is simply a projection towards hope.

The human being is an open universe. The 21st century has seen the emergence of philosophical anthropology as a promising first philosophy oriented towards hope (for an introduction to philosophical anthropology from a phenomenological perspective, see San Martín[66,67]). In order to become a first philosophy, philosophical anthropology must be based in a scientific understanding of reality. Philosophers must therefore be familiar with computational advances in neuroscience. However, philosophical anthropology must also have the capacity to describe the changing figure of the human being in the 21st century and precisely define the philosophical

issues that may inspire the future work of neuroscientists. This close, bilateral collaboration is the only way to prevent one discipline from losing sight of the other in a continually growing Tower of Babel.

The ontological issue of qualia is potentially the most important issue today for collaboration between neuroscience and philosophies. If we accept Bunge's emergentist monism as the option that is most compatible with neuroscience, as well as his proposal that mental properties are an attribute of psychons, and consider the mind to be a radically intersubjective emergent property, then it would remain for future philosophical enquiry, linguistics, and systems neuroscience to clarify whether it would not be more appropriate to formulate the brain-mind problem as the "brains-mind problem". If systems neuroscience takes the brains-mind problem as an object of study and focuses on the understanding of combined human action[68] and the role of "self" in this action,[69] then it may shed light on the conditions of possibility of the *logos* and the transcendental subject. The exactification of the brains-mind problem will require study into the way in which shared semantic fields are created in intersubject speech acts and the role in social cognition of mediators of neuroplasticity. This involves a revision of Scheler's theory of love[70] in the language of neuroscience. Finally, the new challenge of the 21st century will be the modelling, exactification, description, and empirical objectification of the mechanisms that give rise to mental neural systems through interaction between plastic neural systems located in one or several brains. The mechanisms of intracerebral connectivity have been better modelled than mechanisms of intercerebral connectivity. Regarding the latter, speech acts seem to be the main mechanism, with neurohormonal communication through smell also playing an important role. Other alternatives, such as the application of quantum mechanics to the brain, defended by neuroquantology[71] and other holistic approaches appear to be of limited compatibility with the currently validated models, which are closer to a systematic ontology like the one proposed by Bunge. To summarise the systematic materialist proposals based on neuronal organisation, we can cite various connectionist models, which have assisted in our understanding of the systemic organisation of the brain: Donald Hebb's[72] "cell assemblies", Dalbir Bindra's[73] "presently excited gnostic organisation" (pexgo), Alexander Luria's[74] "working constellations of neurons", Mario Bunge's[60,61] "psychon" model, Francisco Varela's[55,75] "neural assemblies", Joaquín Fuster's[45,65] "cognits", Peter van der Helm's[76] "gnosons", or Meehan and Bressler's[77,78] "neurocognitive networks".

Such an enquiry into the conditions of possibility of the emergence of mental properties and its most characteristic indicator (consciousness) is of clinical usefulness for at least two reasons. Firstly, it defines the discipline of clinical neuroscience in a way that is coherent with materialist ontology.[79] Secondly, it helps in formulating clinical problems as inverse problems (scientific problems are forward; technological problems are inverse). For example, Otto Dörr characterised schizophrenia as a logopathy, or pathology of the *logos*.[80] In this case, the inverse problem is the diagnostic usefulness of the abnormal experiences called "basic symptoms",[81] which are probably indirect indicators of the underlying connectopathy of the disorder.[82] Another example of an inverse problem in clinical practice, in this case from clinical neurology, is elucidating whether or not consciousness exists in a vegetative state and understanding the relation of this with akinetic mutism.[83] Problems of this type represent the path along which clinical neurophenomenology must develop.

Subjectivity is the hermeneutic system of a body open to inter-individual communication.[84] When this openness is lost, or in other words when communication ceases, the self is thrown into *aporia*. This leaves two options: alienation or suicide. The 20th century was a sad experiment and warning of both *aporias* of the self. When human relationships are merely instrumental, the uncommunicative subject is alienated as a thing or "thingified", as described by San Martín.[85(p278)] The *aporia* of the collective subjectivity born of romantic idealism led first to the alienation of fascism, and then to modernity's suicide, the Second World War. This was the conclusion of a story that began with the reflexive subject of the Greeks. The appropriation of *logos* as dreamed by Plato after his Pythagorean voyage to Sicily, that early hubris of dreaming an individual, immortal soul, extinguished itself in Hiroshima and was awakened to this fact in Paris in May 1968. Since then, it has only been possible to understand subjectivity as a shared subjectivity in the hope for peace. This is what is new in the 21st century, the hope that neuroscience may clarify the way in which the plastic circuits of the brain interact through language, forming a shared *logos*. This would make it possible to find the path by which a morality

founded on a perpetual, open dialogue may harmonise human life, doing away with both alienation and suicide.

Conflicts of interest

The author has no conflict of interest to declare.

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