Preface

The understanding of mind and consciousness is one of the most exciting and challenging enterprises in the human's quest for comprehension of ourselves and of the universe as a whole. Chiefly, what is the nature of the mind and its relationship with the brain? What is it that makes us human and provides us with the qualities and skills that make us what we are? What is the source of the experience of ourselves? In spite of their importance, these questions remained largely neglected by philosophy and science during most part of the twentieth century. However, in the last 2 decades, there has been an exciting revival of interest in this subject in the academic milieu.

Discoveries in neuroscience and neurotechnology, in particular, have provided a unique window through which we can glance into the intricate workings of the human brain. Even though these technologies have evolved, they have also shown the fundamental limitations that currently exist in our understanding of the human mind. As put by the philosopher of mind David Chalmers (1995), despite the extraordinary advances of neuroscience, explaining conscious experience "poses the most baffling problems in the science of the mind" (p.200).

However, many people, even in the academic world, think that these questions have been already answered. They believe that the human brain is the answer, that mind does not exist, or it is just the product (for some, an epiphenomenon, an ineffective by-product) of brain chemistry and electric activity. Many also see the brain as an entity that can see, hear, think, feel, and make decisions. However, those seem to be unwarranted conclusions. As put by the neuroscientist Eccles (Popper and Eccles 1977:225):

> There is a general tendency to overplay the scientific knowledge of the brain, which, regretfully, also is done by many scientists and scientific writers. For example, we are told that the brain 'sees' lines, angles (…) and that therefore we will soon be able to explain how a whole picture is 'seen' (…). But this statement is misleading. All that is known to happen in the brain is that neurons of the visual cortex are caused to fire trains of impulse in response to some specific visual input.

A similar complaint was made by another couple composed of a philosopher and a neuroscientist who consider "the ascription of psychological – in particular, cognitive and cogitative – attributes to the brain is (…) a source of much (…) confusion.

(…) the great discoveries of neuroscience *do not require* this misconceived form of explanation" (Bennett and Hacker 2003:3–4).

Although reductionist materialism is a hypothesis worth pursuing, it is not a "scientific fact," as many believe. However, several reductionists accept that it is not yet a "scientifically proven fact," but it will become one soon. This belief that "at some unspecified time in the future" (p.205), it will be scientifically shown how brain generates mind is what Popper and Eccles called *promissory materialism*.

Of course that reductionism is a legitimate working theory regarding the mind-brain problem, however if it is hastily taken as the final and definitive answer, it might lead to a dogmatic and premature closure of this quest, which is one of the most important challenges to human knowledge. This approach is a dangerous epistemological posture, since the bare fact is that we are far from actually understand and explain mind. Using the terminology of the philosopher of science Thomas Kuhn (1970), we could say that we are in a preparadigmatic phase regarding the mind-brain problem. A preparadigmatic period is when there is no consensual acceptance by the scientific community of a specific paradigm (a framework of key theories, instruments, values and metaphysical assumptions for a given academic discipline) (Bird 2009). We have several candidates to be the scientific paradigm for the study of consciousness, but none have actually achieved that point yet, characterizing the field as an immature science.

One of the adverse consequences of the premature acceptance of a theory is that finding confirmatory examples of almost any theory is an easy task (Popper 1995). Much data is usually presented to support that mind has been fully explained as a product of brain activity. This often includes examples of psychophysiological concomitance and showing that brain injury or a neurophysiological change is often followed by some alteration in mind. However, as William James (1898) demonstrated more than a century ago, these data can also be accommodated by a *transmission theory* in which brain acts as a filter, having a "permissive or transmissive function" (p.291), acting as "an organ for limiting and determining to a certain form a consciousness elsewhere produced" (p.294). Also, as put by Chalmers (1995), studying neural correlates of consciousness, it is not the same as explaining consciousness or how and why these processes might give rise to conscious experience. There is an "*explanatory gap* between the functions and experience, and we need an explanatory bridge to cross it" (p.203).

According to the philosopher of science Karl Popper, to truly test a theory, we should be committed to look for evidence that could possibly falsify that theory. A good scientific theory withstands vigorous attempts to find contrary evidence. However, Kuhn (1970) showed that scientists usually are not able to recognize phenomena not allowed by the paradigm they are committed to:

> Can it conceivably be an accident, for example, that Western astronomers first saw change in the previously immutable heavens during the half-century after Copernicus' new paradigm was proposed? The Chinese, whose cosmological beliefs did not preclude celestial change, had recorded the appearance of many new stars in the heaven at a much earlier date (Kuhn 1970, p. 116).

The recognition that we are in a preparadigmatic phase in the exploration of the mind-brain problem would enable us to pursue a more fruitful investigation. It is worthwhile to remember that the scientific skills required to work in a preparadigmatic phase are different from those required during a paradigmatic phase, a period called by Kuhn as *normal science.* Fruitful work in preparadigmatic or revolutionary periods requires a more open-minded approach and not too strong commitment to any of the paradigm candidates. It would also require enlarging as much as possible the diversity of the empirical base and avoiding rushed rejection of hypotheses (Chibeni and Moreira-Almeida 2007).

A good scientific theory needs to be able to explain a wide and diversified range of phenomena (Hempel 1966). A theory based on a limited variety of phenomena has a very fragile base. The mere repetition of some sort of findings adds little strength and validity to a given theory. So, the deliberate search of new kinds of empirical observations to try a given paradigm is of great value because it may offer new and valuable confirmations, or, on the opposite, may lead to its rejection.

Throughout history, scientific revolutions often occurred when brilliant scientists took into account a wide range of previously unknown or dismissed phenomena. Galileo with his telescope and Charles Darwin during his 5 years long travel in the Beagle gathered an enormous mass of empirical evidence that were not available to most scientists at their time. The trip and the telescope allowed Darwin and Galileo to face a huge broadening of the empirical base, a base that could no longer be explained by the biological and astronomical established paradigms at their times. The end of those stories is well known to us. The same happened with classic physics, which, more than one century ago, seemed to be able to explain the whole nature. Such certainty made the eminent physicist Lord Kelvin state in 1900, a few years before Einstein developed relativity theory: "There is nothing new to be discovered in physics now, all that remains is more and more precise measurement." In fact, classic physics is very efficient in explaining most of the physical phenomena happening in our daily lives. However, when the study of microscopic particles and extreme velocities began, its limitation became evident, giving birth to the scientific revolution of modern physics (Greyson 2007).

So, the science and philosophy of mind need to enlarge their current timid scope and deal with a much wider range of phenomena if they in fact wish to make a truly significant contribution to the understanding of mind and its relationship with brain. In the exploration of the mind-brain problem, it is essential to take into consideration the whole range of human experiences, it does not matter how odd they may seem at first sight. Specifically, experiences often called "anomalous" and/or "spiritual" constitute a kind of empirical data that have been neglected in the last century, but with a high potential of being of enormous heuristic value (Cardeña et al. 2000, Eysenck and Sargent 1993, James 1909, Kelly et al. 2007). In order to not repeat the faults described above, we need to pay special attention exactly to the most extreme and challenging phenomena to advance our understanding. In this kind of exploration, it is necessary to give epistemological supremacy to consistent empirical data over any established or cherished theoretical hypothesis (Chibeni and Moreira-Almeida 2007), an approach in line with what was called by James (1976) as radical empiricism.

A whole range of human experiences that are at the core of spiritual traditions and beliefs have been neglected by academics, who refuse to take them seriously as empirical data that might shed light on the exploration of human nature. One possible explanation of this dismissal is the very common confusion between science and the metaphysical/philosophical positions of scientism and materialism. As John Haught (2005) discussed, although there is a widespread belief that science (a method of exploration) is inseparable from a materialistic ideology (a metaphysical proposition, a worldview), "it is not written anywhere that the rest of us who appreciate science have to believe that (materialist naturalism). In fact, most of the great founders of modern science did not. (…) [it] is not a scientific statement but a profession of faith" (p.367). Given the misguided conflation of science with materialism, it is understandable that most academic discussions avoid the investigation of experiences that might suggest a transcendental or nonmaterial reality, or, at least, take into consideration these phenomena as human experiences that deserve being studied in depth (Wallach and Reich 2005; Reich 2007). Actually, it is a mistake to take the materialistic worldview as a limitation or boundary for the scientific enterprise. Hefner (2006, 2007) and Helmut Reich (2007) convincingly argue for the enlargement of the empirical base for the scientific study of spiritual aspects of human experience, even (or mainly) if the observational data do not fit the existing mainstream (philosophical) framework.

It is also important not to reject an explanatory hypothesis because it is not fashionable or because it has been associated to superstition. Isaac Newton's formulation of gravity faced strong opposition because he was not able at that time (and we still are not able too) to explain how an object could influence another object at distance, with no material contact. This was even a more important problem since it was then prevalent two paradigms, mechanism and corpuscularianism, where the different properties of matter should be fully explained by the mechanical interactions of corpuscules (Blackburn 2008). Like Newton, Semmelweis and John Snow faced strong resistance and accusations of superstition and unscientific thinking by their contemporary scientists when proposing the contagion and germ theory, since these concepts were popular among superstitious and poorly educated people, while well educated people usually "knew" that miasma's theory was the truth (Lilienfeld 2000; Smith 2002; Vandenbroucke 2000).

Another kind of naïve epistemological prejudice is related to the rejection of qualitative data and the overemphasis on statistical analysis and quantitative data. It is often forgotten that one of the most important contemporary scientific paradigms, natural selection, emerged from qualitative studies performed by Charles Darwin (Ghiselin 1972). According the philosopher of science Alan Chalmers, people holding the idea that "if you cannot measure, your knowledge is meager and unsatisfactory" fail to "realize that the method that they endeavor to follow is not only necessarily barren and unfruitful but also is not the method to which the success of physics is to be attributed" (Chalmers 1978, p. xiv).

In the search for a paradigm to understand consciousness, it is necessary that it explains as much as possible the wide range of human experiences. It is essential to keep both intellectual humility and scientific rigor. As stated by Popper (1995),

"in searching for the truth, it may be our best plan to start by criticizing our most cherished beliefs" (p.6).

Unfortunately, such open-minded approach is not always present in the history of science. Scientific revolutions did not triumph because the new paradigm was able to convert all skeptics and leaders of the opposition:

> The transfer of allegiance from paradigm to paradigm is a conversion experience that cannot be forced. Lifelong resistance, particularly from those whose productive careers have committed them to an older tradition of normal science, is … an index to the nature of scientific research itself. The source of resistance is the assurance that the older paradigm will ultimately solve all its problems….
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> …[A] generation is sometimes required to effect the change…. Though some scientists, particularly the older and more experienced ones, may resist indefinitely, most of them can be reached in one way or another. Conversions will occur a few at a time until, after the last holdouts have died, the whole profession will again be practicing under a single, but now a different, paradigm. (Kuhn 1970, pp. 151–152)

The present book's main objective is to discuss the relationship between the mind and the brain from scientific and historical/philosophical perspectives. We focused on the discussion of topics about the mind-brain problem that are relevant, but usually neglected in academic debates. We have discussed basic concepts and empirical data that do not fit well in the reductionist hypothesis to explain the mind-brain problem. Most of chapters are further development of papers presented at the "Exploring the Frontiers of the Mind-Brain Relationship: An International Symposium" that was organized by this book's editors and took place in São Paulo (Brazil) in September 2010. This event, promoted by the Schools of Medicine of the Federal University of Juiz de Fora and of the University of São Paulo, put together several leading international researchers in the field, and proved to be an exciting and fruitful opportunity to rethink mind-brain relationship. The organizers and contributors of this work do not necessarily agree with all the positions expressed through the book, but are open enough to audaciously present and discuss arguments and data that too often do not have their deserved space in academic debate, which is supposed to be governed by freethinking and tolerance to divergences.

The book begins by addressing some theoretical (philosophical, historical, and physics) aspects related to common misconceptions, poorly known historical facts, and ingenious theories with the purpose of settling the debate in clearer and more solid grounds. This beginning shows that reductionist materialism is not the only rational and logic option and that other approaches are, at least, intellectually viable. It is followed by chapters presenting empirical data suggestive of nonreductionist views of mind. We believe that this book will provide an opportunity for a high-level debate of controversial and challenging topics in the quest for understanding the human mind.

The first two chapters discuss philosophical issues. They address several limitations of reductionist materialism and of arguments against nonmaterialist approaches. Saulo Araujo discusses in Chap. 1, historical and philosophical limitations of what he called "materialism's eternal return." He shows that the current and fashionable metaphors related to materialist reductionist explanations and the hope that in short

period of time they would fully explain mental phenomena (promissory materialism) are an old phenomenon dating at least since the eighteenth century. Next, Robert Almeder, in Chap. 2, discusses and rejects five basic objections that materialists often raise to Cartesian Mind-Body dualism.

Carlos Alvarado, at Chap. 3, finishes the presentation of some theoretical background to enrich the historical and philosophical perspective in analysis the data that will be presented. He presents a historical overview of a productive and fruitful, but currently neglected, tradition of investigating and discussing the implications of psychic/anomalous phenomena to the mind-brain problem. His purpose is not to defend any specific position regarding the ontology of these experiences, but to show the relevance of them for our discussions.

The next couple of chapters, written by the physicist Chris J. S. Clarke (Chap. 4) and the physicians Stuart Hameroff and Deepak Chopra (Chap. 5), present models based on modern physics compatible with nonreductionist views of mind. Although quantum physics has been too often misused in discussions related to consciousness and spirituality by authors who actually have little acquaintance and expertise in this subject, this is certainly not the case with our three collaborators on this topic.

The next two chapters present and discuss data regarding neuroimaging studies, correcting several misunderstandings about the interpretations of this kind of findings to mind-brain problem. Jesse Edwards, Julio Peres, Daniel Monti, and Andrew Newberg (Chap. 6) competently review the increasing body of data related to neurophysiological studies on mindfulness. Mario Beauregard (Chap. 7) presents cutting-edge data regarding emotional regulation, suggesting that mind may act as an efficient cause, changing brain function. He also discusses the findings and implications of neurofunctional studies of spiritual experiences.

The last four chapters present and discuss the implications for the mind-brain problem of four types of human experiences that have often been called spiritual or anomalous exactly because they do not fit, *prima facie*, with reductionist materialist perspectives. However, despite how odd they may seem at first glance, they have been subject to in-depth studies by dozens of eminent scientists for more than a century. Two chapters deal with intriguing experiences happening near death and in the dying process. Peter Fenwick, a leading authority in studies of consciousness in dying people, wrote the chapter on near-death experiences (Chap. 8). He, with Franklin Santos, at the Chap. 9, discusses several kinds of end of life experiences and their theoretical and clinical implications.

Finally, Alexander Moreira-Almeida (Chap. 10) discusses studies about mediumship, an experience when a subject (the medium) claims to be in contact with deceased personalities, and Erlendur Haraldsson (Chap. 11) summarizes findings of investigations with children who claim to remember previous lives. Although most cases of both of these experiences in daily life do not present any challenging evidence, there are several well-documented cases that deserve further investigation.

This book is addressed to a wide academic audience, including philosophers, psychologists, physicians, neuroscientists, and all others interested in the mind-brain problem. But it may be also useful for nonacademic educated people interested in the subject. The book as a whole was conceived to be a rigorous and scientific one, but

not hermetic; we have tried hard to make it accessible as much as possible to a broad range of readers. Given the specific interests of different readers, each chapter may be read separately – they can stand by themselves. However, as described previously, the book follows a logical sequence in which the previous chapters provide a foundation and background for a deeper analysis of what follows.

We hope you also may find this book useful and thought-provoking in the exploration of the frontiers of mind-brain relationship!

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