Asian Journal of Psychiatry xxx (2013) xxx–xxx

Contents lists available at SciVerse ScienceDirect

Asian Journal of Psychiatry

journal homepage: www.elsevier.com/locate/ajp

Spirituality & Psychiatry

Implications of spiritual experiences to the understanding of mind–brain relationship

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ARTICLE INFO

Article history:
Received 21 July 2012
Received in revised form 31 December 2012
Accepted 2 January 2013
Available online xxx

Keywords:
Spirituality
Spiritual experiences
Mind
Consciousness
Mind–brain relationship
Mind–brain problem

ABSTRACT

Objective: While there has been a large increase in scientific studies on spirituality, there has been too few of studies of the core of spirituality: spiritual experiences (SE), which often involve altered states of consciousness, reports of anomalous experiences and of consciousness beyond the body. This paper argues that SE, although usually neglected in debates regarding mind–brain relationship (MBR), may provide the much needed enlargement of the empirical basis for advancing the understanding of the MBR.

Methods: This paper briefly presents and discusses recent scientific investigations on some types of SE (meditative states, end of life and near death experiences, mediumship and alleged memories of previous lives) and their implications to MBR.

Results: Neurofunctional studies of SE have shown that they are related to but not necessarily caused by complex functional patterns in several brain areas. The study of meditative states, as voluntarily induced mind states that influence brain states has been a privileged venue to investigate top-down (mind over brain) causation. End of life and near death experiences offer cases of unexpected adequate mental function under severe brain damage and/or dysfunction. Scientific investigations of several types of SE have provided evidence against materialistic reductionist views of mind.

Conclusions: The recent trend to scientifically investigate SE has already produced interesting and thought-provoking findings that deserve careful further exploration. Because of their potential implication, these findings may also contribute to the understanding of MBR, which remains an important, yet poorly explored way to investigate human nature.

1. Introduction

In the last decades there has been a large increase in scientific studies on spirituality, especially on the association between religious involvement variables and health outcomes (Koenig et al., 2001). However, there has been a paucity of studies of the core, of what many claim to be the source of spirituality: spiritual experiences (SE).

There is a lasting controversy on the definition of spirituality. More recently, there has been a tendency of enlarging the definition of spirituality. This expansion of concept brings the risk of missing the core of the concept of spirituality and of conflating it with psychological constructs such as well-being and purpose in life (Koenig, 2008; Moreira-Almeida and Koenig, 2006). Etymologically, spirituality comes from "spiritual", related to the "spirit": non-material aspects of universe and human beings (Merriam-Webster, 2012; Hufford, 2010). A recent paper found the belief in supernatural spirits as the best predictor of spirituality (Lindeman et al., 2012). The belief that there is a non-material component in the universe and in the essence of human being is a belief shared by many, if not most spiritual traditions in the world (Hufford, 2010; Walach and Reich, 2005). Based on this it is not surprising that SE often involve altered states of consciousness, reports of anomalous experiences and of consciousness beyond the body. Some authors argue that SE are the source of beliefs in a spiritual realm (Hufford, 2005, 2010; Walach and Reich, 2005).

Too often, SE have been neglected by academics, who refuse to take them seriously as empirical data that deserve careful and rigorous exploration. One possible explanation of this dismissal is the very common confusion between science and the metaphysical/philosophical positions of scientism and materialism (Walach and Reich, 2005; Araujo, 2012). As Haught (2005) discussed, although it is a widespread belief that science (a method of exploration) is inseparable from a materialistic ideology (a worldview), "it is not written anywhere that the rest of us who appreciate science have to believe that. In fact, most of the great founders of modern science did not." (p. 367).

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http://dx.doi.org/10.1016/j.ajp.2013.01.006

2. Mind–brain relationship

The understanding of mind and consciousness is one of the most interesting and challenging quests human beings have posed to themselves. Particularly relevant is the investigation of the mind–brain relationship (MBR), how brain relates to mind and vice versa. There are several hypotheses, among the most discussed: mind and brain are the same, brain produces mind, and brain is a tool for mind manifestation. Although this is a millennial debate, there have been renewed interests in the study of consciousness and in the MBR in the last two decades.

Many people, even in the academic environment, think that the mind–brain problem has already been solved, that it has been scientifically demonstrated that brain produces mind. Some others, more cautious, state that we have not proved that yet, but we are very close to demonstrate how brain produces mind. However, the most respected experts in consciousness studies recognize that we are far from understating mind and its relationship to the brain. As put by the philosopher of mind Chalmers (1995), despite the extraordinary advances of neuroscience, explaining conscious experience "poses the most baffling problems in the science of the mind" (p. 200).

The hope that in the (near) future scientists will show how brain produces mind was called by Popper and Eccles (1977) "promissory materialism", a rhetorical strategy that has been used at least since the 18th century (Araujo, 2012). Undoubtedly, materialist reductionist view of mind is a hypothesis worth pursuing, however, the hastily acceptance of such hypothesis as the final answer is detrimental to the advancement of human understanding of MBR. The premature closure of an unsolved philosophical/scientific quest is unconstructive since it tends to hamper the development and empirical testing of alternative potentially useful scientific hypotheses. Actually, the discussion regarding MBR has been stuck for a long time. The enlargement of the empirical basis may be a necessary step to move the discussion forward. The enlargement and diversification of empirical observations provided by Galileo's use of telescope and Darwin's five year travel in the Beagle were essential in the scientific revolutions promoted by such pioneers (Chibeni and Moreira-Almeida, 2007; Moreira-Almeida and Santos, 2012).

We argue that SE may provide the much needed enlargement of the empirical basis for advancing the understanding of the MBR. However, SE have been usually neglected in this discussion, but it was not always the case. In the decades around the transition between 19th and 20th centuries many high level scientists investigated in depth the implications of SE for MBR. Some examples are William James, Frederic W.H. Myers, Alfred Russell Wallace, Cesare Lombroso, Oliver Lodge, Pierre Janet, C.G. Jung, Theodore Flournoy, and William McDougall. Including the Nobel laureates Charles Richet, Pierre and Marie Curie, J.J. Thomson, Henri Bergson, and Lord Rayleigh (Alvarado, 2012; Moreira-Almeida, 2012). We have recently edited a book that, through an interdisciplinary perspective, investigates the theoretical and empirical implications of SE to MBR (Moreira-Almeida and Santos, 2012). This paper summarizes some of the main points of that work.

3. Spiritual experiences

During the second half of 19th century and most part of 20th century, SE were often explained away as symptoms of mental disorders. In this way, SE were usually considered as consequence of brain disorders, psychological defenses or immature personality (Le Maléfan, 1999; Moreira-Almeida et al., 2005). However, there has emerged a growing body of evidence that SE are not usually related to mental disorders and that they are often related to actually better mental health (Moreira-Almeida and Cardena, 2011).

This paper will cover recent scientific investigations on some types of SE that have been carefully studied and have provided useful data to the understanding of human mind and its relationship with the body. Because of space constrains, I will present a very short overview of each topic just to show the relevance of SE to MBR, more detailed data and discussion are available in the references provided.

3.1. Meditative states

During deep meditative states many people experience altered states of consciousness including loosening of ego's border and sense of union with other beings and the universe. This type of SE has been one of the most investigated, especially under neuroimaging techniques. Two misunderstandings have been pervasive regarding neuroimaging investigations of SE: (a) "God spot": the idea that there is a specific brain region (usually in the temporal lobe) responsible for SE; (b) the assumption that showing a certain type of brain activation during a SE or brain stimulation raising an experience similar to SE implies that the brain is the ultimate cause of the SE. Regarding the first assumption, scientific data available show that SE are complex and multidimensional phenomena related to several different brain areas involved in a variety of functions (Beauregard, 2012; Beauregard and Paquette, 2006; Edwards et al., 2012). The second conjecture is related to the fallacy of conflating association with causation. In addition, producing a given experience by brain stimulation does not mean that this experience is always merely a brain phenomenon, with no external reality. Although certain brain areas have been associated with hearing and even produce auditory experiences when stimulated, this obviously does not mean that there is no auditory experience based on an external source (Hageman et al., 2010).

In addition to demonstrating the brain correlates of several consciousness states, the study of meditative states, as voluntarily induced mind states that influence brain states, is a privileged venue to investigate top–down (mind over brain) causation (Beauregard, 2007).

3.2. End of life and near death experiences

End of life and near death experiences (NDE) provide valuable opportunities to study MBR. Since the dying process often involves a progressive impairment of brain function and death may be defined as the stopping of brain functioning, the investigation of the relation between these brain changes and consciousness may be very informative to improve our understanding of MBR.

NDE is a SE that has received a lot of attention in the last decades. Probably, most of the interest in NDE is related to the claims that conscious and spiritual experiences would happen during clinical death. If mind is just a product of brain activity, when brain functioning is impaired or stopped, consciousness should be disturbed or ceased. Several authors, who do not usually do empirical studies in NDE, have argued that all NDE features could be explained by brain activity and psycho-cultural factors (Lester, 2005; Mobbs and Watt, 2011). However, those who have conducted the largest empirical studies on NDE argue that these factors cannot explain all NDE features and that NDE suggest some sort of consciousness beyond the brain (Athappilly et al., 2006; Fenwick, 2012; Greyson, 2007; Parnia, 2007; van Lommel, 2011). Prospective studies with hundreds of cardiac arrest survivors have found that NDE could not be explained by medication use, religious belief, fear of death, or cognitive dysfunction (Greyson, 2003; Parnia et al., 2001; Van Lommel et al., 2001). Experiences induced by hypoxia, drug use and brain stimulation seem to have some

Please cite this article in press as: Moreira-Almeida, A., Implications of spiritual experiences to the understanding of mind–brain relationship. Asian J. Psychiatry (2013), http://dx.doi.org/10.1016/j.ajp.2013.01.006