Vice-Presidential Address 2004

What is the place of Psychophysiology in the Interdisciplinary Sciences?
Welcoming Address of the Vice-President (Academic Affairs) at the Opening Ceremonies of the 12th World Congress of Psychophysiology, I.O.P. 2004

Erol Başar
Dokuz Eylül University, Brain Dynamics Multidisciplinary Research Center and Faculty of Medicine, Department of Biophysics, 35340, Balçova, İzmir, Turkey

Available online 12 September 2005

What is Psychophysiology, what is physiology? Are they bridges between physics, physiology and psychophysiology? Do we again need a common language in the 21st century?

“Psychophysiology”, as an integration of physiology and neuroscience, provides the only in vivo theoretical framework with a panoply of electrophysiological and neuroimaging techniques for the establishment of methodologically essential and crucial links for the investigation, understanding and mapping of brain functions pertaining to basic cognitive, emotional and motivational processes as well as to normal and pathological conditions (Mangina, 2003). Further, according to President C.A. Mangina, psychophysicists are scientists integrating scopes of several disciplines. From the days of Helmholtz, the evolution of “Brain Dynamics and Memory” was realized by neurologists, psychiatrists, psychologists, neurosurgeons, neurophysiologists, and biophysicists, who also contributed to the integration of all these disciplines, namely to “psychophysiology”.

Can the four “P”s—Physics, Physiology, Psychology and Physiology—provide a common language or common links? I favor the following view: a union between biophysics, (which combines realms of physics, physiology and molecular biology) and psychology is indispensable. Both disciplines are inseparable. In the 19th century, Hermann von Helmholtz being an experimental biophysicist, unified the four P’s at the beginning without gloriously emphasizing this. He did not only launch predictions but also provided a strong empirical foundation by raising questions and trying to find experimental evidences.

In the 20th century, Hayek launched a very important theoretical frame, but did not perform genuine experiments since he was an economist, i.e., a theoretician.

In the first half of the 20th Century, Psychology went through a magnificent breakthrough with the works of Karl Lashley, Donald Hebb, and Skinner to mention only a few. Marcel Proust and Henri Bergson combined philosophy and psychological concepts to open the way to episodic memory. Hans Berger, Ramon Cajal and Lord Sherrington launched breakthrough in neurological sciences. In parallel, a magnificent breakthrough took place in physics with Henri Poincaré, Albert Einstein and the Copenhagen School with the works of Niels Bohr, Werner Heisenberg, Max Born, and E. Schrödinger.

New steps include the evolution of Molecular Biology with Jacques Monod, Cybernetics by Norbert Wiener, Synergetics by Hermann Haken, Study of Dissipative structures by I. Prigogine, Catastrophe theory of René Thom. New approaches to Cognitive Processes have been very successful by use of fast computers, fMRI, MEG and PET.

At the century of René Descartes (1596–1650) and of Blaise Pascal (1623–1662) tools for measuring the “Thinking Processes” were not available. Now, we have some of them.

Are the progresses in science now powerful enough to describe the processes of mind? Mankind achieved important steps, although we will never be able to completely solve the problem of brain body and mind incorporation. However, we have to make trials, and ask further questions.

In the twentieth century, the structure of the atom is successfully illuminated, processes of thought seem to be

E-mail address: erol.basar@deu.edu.tr.

0167-8760/$ - see front matter © 2005 Published by Elsevier B.V.
yet invisible. Has time come to tackle common concepts from all branches of science and philosophy?

The Ionian philosophers Anaxagoras, Leucippus, and Democritus of the fifth century B.C. postulated that all mater is made of a set of particles, which were atoms to denote their presumed invisibility. Their concept of a world made up of invisible, incompressible eternal atoms in motion is best known through the writings of the Latin poet Lucretius (98 to 55 B.C.):

_Bodies of things are safe till they receive_
_A force which may their proper thread unweave,_
_Nought then returns to nought, but parted falls_
_To Bodies of their prime Originals._
_Then nothing sure its quite forsakes,_
_Since Nature one thing, from another makes,_

(From Lucretius: “Concerning the Nature of things (De Rerum Natura)”

Later, in the same sense of Lucretius, René Descartes (1596) made the daring suggestion that “Everything in the Universe could be explained in terms of a few intelligible systems and simply approaches upon which the stars, and the earth and all the visible word may have been produced”.

Where are we now, after twenty-one centuries after Lucretius and four centuries later after Descartes? Where do we stay in psychophysiology? Can the amalgamation of the four “P”s indicated above open new perspectives to better understand integrative sciences?

I think yes. At least, I think that “Psychophysiology” presents one of the most important arenas in interdisciplinary sciences, the conjecture being opened by Descartes, von Helmholtz and von Hayek.

**Acknowledgements**


**Reference**