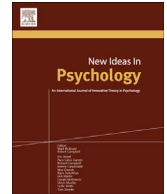




ELSEVIER

Contents lists available at [ScienceDirect](#)

New Ideas in Psychology

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

How the tower of information leads to an integrated framework for biopsychosocial ideas

Tom Weidig ^a, Gilles Michaux ^{b, *}^a 12, Rue Marguerite-Séraphine Beving, L-1234, Luxembourg^b Centre for Health Promotion (ZithaGesondheitsZentrum), Hôpitaux Robert Schuman, ZithaKlinik, 36 Rue Ste Zithe, 2763 Luxembourg, Luxembourg

A B S T R A C T

Keywords:Behavioral medicine
Biopsychosocial model
Mind-body-problem

The biopsychosocial model is the prevailing conceptual model in relationship to which clinicians organize their analysis, evaluation and intervention. Since its promotion by Engel, little work has been done to provide a more solid conceptual basis for the relationship between the biological and the psychosocial processes in sickness and in health. We propose such a framework, using the perspective of life forms as information gathering and utilizing systems. We derive the simplest non-trivial model, the four domain model, which consists of the physical domains determining human processes: the environment, the body, the confined memories, and the communicable memories. We then re-visit Engel's case study to contrast our model with his systems approach, and apply it to issues in psychosomatics and the mind-body connection.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

In his 1977 *Science* article, Engel stated explicitly what has been known implicitly for a long time, namely that humans are affected by bodily, psychological, and social factors (Engel, 1977). He proposed to study and treat human disorders within a single holistic framework using a systems approach, which describes humans as sandwiched between systems nested at varying levels of complexity, from the molecular and cellular to the societal and biosphere level (Engel, 1980). An event at one level affects other levels, and a disorder is never contained to one level only. While Engel's term "biopsychosocial" stuck and struck a chord with practitioners who experienced the incompleteness of either the biomedical model or the psychosocial perspective in their daily work (especially in general medicine, psychiatry, and psychosomatics), the

biopsychosocial "model" is at best a list of all influencing factors. The systems approach fails to integrate them in a deeper way using a better understanding of the body–mind relationship (Leigh, 2010; Malmgren, 2005; McLaren, 1998). Each human discipline focuses on describing a subset of influencing factors on humans in exquisite detail, resulting in a disparate collection of disciplines, each using its own language. Integrating the psychosocial into the biomedical model is the key obstacle, to which we propose a solution.

The biomedical model uses a conceptually clear process-state framework embedded in the physical world. Biological processes (e.g., wound healing) are defined as physical changes in underlying physical states (e.g., blood and skin cells). We can in principle point our finger at the physical objects involved. But can we point at love or motivation? Psychosocial models do not use physical states, but less well-defined and more complex constructs, such as love and motivation, to describe psychosocial processes and link these fuzzy constructs to each other, e.g., "Being in love influences the motivational state". In fact, the

* Corresponding author. ZithaGesondheitsZentrum, Hôpitaux Robert Schuman, ZithaKlinik, 36 Rue Ste Zithe, L-2763 Luxembourg, Luxembourg. Tel.: +352 2888 6385; fax: +352 2888 4949.

E-mail address: gilles.michaux@hopitauxschuman.lu (G. Michaux).

motivational “state” is not an actual physical state, but rather a lasting process of behavior and experience. Not only are these constructs difficult to describe in terms of a change of physical states, they overlap with each other and underlying biological factors. A good example is Bronfenbrenner's bioecological model, which categorizes the impact of environmental influences on a biopsychosocial organism using five nested systems from the Microsystem to the Chronosystem (Bronfenbrenner & Ceci, 1994). Fuzzy constructs are essential to construct “local” models describing the intricacies of a specific type of psychosocial processes, but they also prevent us from extending the biomedical model into a global model. We therefore need to find a generic description of all psychosocial processes that fits to the process-state framework of the biomedical model.

2. Proposing a new framework

2.1. Theoretical background

Our proposed solution hinges on an alternative and rarely discussed definition of life. The physicists Gell-Mann and Hartle proposed a simple definition of life to describe an observer in a quantum world: Life in its essence is an information gathering and utilizing system (IGUS) (Gell-Mann, 1994; Hartle, 2005). The information stored within the organism determines its behaviors along with the biological substrate and environment of the organism. A life form is a special physical system where some of its physical matter is doubly functional in the sense that it not only acts as ordinary matter with its immediate physical environment, but its structure is also used as information by another region and thereby participates in actions at a distance.

A discussion on life's tools of adaptation enriches the IGUS perspective. Dennett proposes the Tower of Generate-and-Test illustrating the four increasingly complex levels of life's adaptation to its environment: genetic mutation, conditioning, model building, and sharing of cultural knowledge. He therefore divides life forms into Darwinian, Skinnerian, Popperian, and Gregorian creatures (Dennett, 1996). Bacteria are Darwinians and can only adapt through gene mutation. Those gene mutations leading to most offspring spread and others die out in the gene pool. Humans however possess all four types of adaptations and are Gregorians. We reinterpret Dennett's picture in terms of physical states in the IGUS perspective, and view an IGUS as storing “a tower of information” built from genetic, associative, and abstract and sharable information. We rediscover this structure in our four-domain model, derived below.

Information is at the heart of many human processes, and the key ingredient missing in Engel's approach. Static genetic information stored in the DNA molecules clearly drives basic biological processes by providing the body with the blueprint for essential and useful protein molecules. But the same is true for psychosocial processes: No psychosocial processes without information processing. The psychological and social disciplines might use complex constructs, such as a divorce, to describe psychosocial

behavioral and experiential processes, but ultimately any psychosocial process runs on a biological system utilizing information physically stored within the brain. For example, “the divorce caused a re-adjustment of his beliefs” can be reformulated as “the divorce changed the informational content of his brain thereby affecting future mental processes and behaviors”. You can only be scared of the spider due to a stored association between the spider's visual representation and a fear reaction. You can only be embarrassed after having compared your behavior to stored information holding your beliefs of acceptable social behavior, and having concluded that your behavior was unacceptable. We bypass the complex, fleeting, and dynamic psychosocial processes by focusing on the stable physical states that drive our behaviors and provide content to our mental processes, namely physically stored information or memories.

We impose the following constraints on the models derived within our framework. First, every human process (including psychosocial processes such as conscious thoughts) has its basis in the physical world; see supervenience in Kim (1998). Second, while every human process is a change of physical states, high-level mental constructs including introspection describe psychosocial processes more efficiently; see conceptual dualism in Malmgren (2005). Third, a model must focus on the physical states to bypass the complex dynamics of processes. Fourth, a model must slice the physical world into domains, like slicing a cake, in order to ensure an efficient and unique taxonomy of the states driving human processes.

2.2. Derivation of the framework

Let us derive the simplest non-trivial model with our slicing method. At each moment in time, the world's objects are in a certain physical state which evolves over time. Humans are embedded in this world. The human brain has evolved to model this changing world, including ourselves and other humans, by categorizing and labeling these processes. These processes might be a simple physical process such the breaking of a bone or as complex as a divorce. In the first step, we slice the world into the organism and its environment: the two-domain model. A key realization here is that a human model is incomplete without modeling the environment; in the same way as understanding computer behavior also requires understanding of its user and the Internet connection.

In a second step, we impose the IGUS perspective, and slice the organism into the body and the physical representation of information. The organism consists of ordinary matter, but some matter is special because it carries information. The structure of this special matter allows our body, specifically brain regions, to utilize information. The cells also utilize information stored in the DNA. We however consider DNA as a part of the body slice, because, unlike the brain's informational content, DNA does not change during the organism's lifetime, except for local random mutations. Note that the body domain and the information domain overlap in those brain regions that also store information across their cells. For example, a loss of memory could be due to a change in the informational

Download English Version:

<https://daneshyari.com/en/article/331635>

Download Persian Version:

<https://daneshyari.com/article/331635>

[Daneshyari.com](https://daneshyari.com)