Holism (from ὅλος *holos*, a Greek word meaning *all*, *entire*, *total*) is the idea that all the properties of a given system (physical, biological, chemical, social, economic, mental, linguistic , etc.) cannot be determined or explained by its component parts alone. Instead, the system as a whole determines in an important way how the parts behave.

The general principle of holism was concisely summarized by Aristotle in the *Metaphysics*: "The whole is more than the sum of its parts" (1045a10).

Reductionism is sometimes seen as the opposite of holism. Reductionism in science says that a complex system can be explained by *reduction* to its fundamental parts. For example, the processes of biology are reducible to chemistry and the laws of chemistry are explained by physics.

Contents

// **History**

The term *holism* was introduced by the South African statesman Jan Smuts in his 1926 book, *Holism and Evolution*

.

[1]

Smuts defined holism as "
The tendency in nature to form wholes that are greater than the sum of the parts through creative evolution.
"

[2]

The idea has ancient roots. Examples of holism can be found throughout human history and in the most diverse socio-cultural contexts, as has been confirmed by many ethnological studies. The French Protestant missionary,
Maurice Leenhardt
coined the term
cosmomorphism
to indicate the state of perfect
symbiosis
with the surrounding environment which characterized the culture of the Melanesians of
New Caledonia
. For these people, an isolated individual is totally indeterminate, indistinct and featureless until he can find his position within the natural and social world in which he is inserted. The confines between the self and the world are annulled to the point that the material body itself is no guarantee of the sort of recognition of identity which is typical of our own culture.

In science

Main article: Holism in science

In the latter half of the 20th century, holism led to systems thinking and its derivatives, like the sciences of chaos and complexity

.

Systems in biology, psychology, or sociology are frequently so complex that their behavior is, or appears, "new" or "
emergent
": it cannot be deduced from the properties of the elements alone.
[3]

Holism has thus been used as a catchword. This contributed to the resistance encountered by the scientific interpretation of holism, which insists that there are ontological reasons that prevent reductive models in principle from providing efficient algorithms for prediction of system behavior in certain classes of systems.

Further resistance to holism has come from the association of the concept with quantum mysticism   .
Recently, however, public understanding has grown over the realities of such concepts, and more scientists are beginning to accept serious research into the concept such as cell biologist Bruce Lipton
[4]

.

Scientific holism holds that the behavior of a system cannot be perfectly predicted, no matter how much data is available. Natural systems can produce surprisingly unexpected behavior, and it is suspected that behavior of such systems might be computationally irreducible, which means it would not be possible to even approximate the system state without a full simulation of all the events occurring in the system. Key properties of the higher level behavior of certain classes of systems may be mediated by rare "surprises" in the behavior of their elements due to the principle of
interconnectivity
, thus evading predictions except by brute force simulation.
Stephen Wolfram
has provided such examples with simple cellular automata, whose behavior is in most cases equally simple, but on rare occasions highly unpredictable.
[5]

Complexity theory (also called "science of complexity"), is a contemporary heir of systems thinking. It comprises both computational and holistic, relational approaches towards understanding complex adaptive systems and, especially in the latter, its methods can be seen as the polar opposite to reductive methods. General theories of complexity have been proposed, and numerous complexity institutes and departments have sprung up around the

world. The   Santa Fe Institute is arguably the most famous of them.

In anthropology

There is an ongoing dispute as to whether anthropology is intrinsically holistic. Supporters of this concept consider anthropology holistic in two senses. First, it is concerned with all human beings across times and places, and with all dimensions of humanity (evolutionary, biophysical, sociopolitical, economic, cultural, psychological, etc.). Further, many academic programs following this approach take a "four-field" approach to anthropology that encompasses physical anthropology, archeology, linguistics, and cultural anthropology or social anthropology. [6]

Some leading anthropologists disagree, and consider anthropological holism to be an artifact from 19th century social evolutionary thought that inappropriately imposes scientific positivism upon
cultural anthropology
.
[7]

The term "holism" is additionally used within social and cultural anthropology to refer to an analysis of a society as a whole which refuses to break society into component parts. One definition says: "as a methodological ideal, holism implies ... that one does not permit oneself to believe that our own established institutional boundaries (e.g. between politics, sexuality, religion, economics) necessarily may be found also in foreign societies." [8]

In ecology

Ecology is the leading and most important approach to holism, as it tries to include biological, chemical, physical and economic views in a given area. The complexity grows with the area, so that it is necessary to reduce the characteristic of the view in other ways, for example to a specific time of duration.

John Muir, Scots born early conservationist [9] , wrote "When we try to pick out anything by itself we find it hitched to everything else in the Universe"

More information are to be found in the field of systems ecology, a cross-disciplinary field

influenced by general systems theory. see
Holistic Community
.

In economics

With roots in Schumpeter, the evolutionary approach might be considered the holist theory in economics. They share certain language from the biological evolutionary approach. They take into account how the innovation system evolves over time. Knowledge and know-how, know-who, know-what and know-why are part of the whole business economics. Knowledge can also be tacit, as described by   Michael Polanyi.
These models are open, and consider that it is hard to predict exactly the impact of a policy measure. They are also less mathematical.

In philosophy
Main articles: Semantic holism and confirmation holism

In philosophy, any doctrine that emphasizes the priority of a whole over its parts is holism. Some suggest that such a definition owes its origins to a non-holistic view of language and places it in the reductivist camp. Alternately, a 'holistic' definition of holism denies the necessity of a division between the function of separate parts and the workings of the 'whole'. It suggests that the key recognisable characteristic of a concept of holism is a sense of the fundamental truth of any particular experience. This exists in contradistinction to what is perceived as the reductivist reliance on inductive method as the key to verification of its concept of how the parts function within the whole. In the philosophy of language this becomes the claim, called semantic holism
, that the meaning of an individual word or sentence can only be understood in terms of its relations to a larger body of language, even a whole theory or a whole language. In the philosophy of mind
, a mental state may be identified only in terms of its relations with others. This is often referred to as
content holism
or
holism of the mental
.

Epistemological and confirmation holism are mainstream ideas in contemporary philosophy. Ontological holism was espoused by   David Bohm in his theory on The Implicate Order.

In sociology
Émile Durkheim developed a concept of holism which he set as opposite to the notion that a s

ociety

was nothing more than a simple collection of individuals. In more recent times, Louis Dumont
[10]

has contrasted "holism" to "

individualism

" as two different forms of societies. According to him, modern humans live in an individualist society, whereas ancient Greek society, for example, could be qualified as "holistic", because the individual found identity in the whole society. Thus, the individual was ready to sacrifice himself or herself for his or her

community

, as his or her life without the

polis

had no sense whatsoever.

Martin Luther King Jr had a holistic view of social justice. In Letter from Birmingham Jail he famously said: "Injustice anywhere is a threat to justice everywhere".

Scholars such as David Bohm [11] and M. I. Sanduk [12] consider the society through the Plasma Physics. From physics point of view, the interaction of individuals within a group may lead a continuous model. Therefore for

M. I. Sanduk

"The nature of fluidity of plasma (ionized gas) arises from the interaction of its free interactive charges, so the society may behave as a fluid owing to the free interactive individuals. This fluid model may explain many social phenomena like social instability, diffusion, flow, viscosity...So the society behaves as a sort of intellectual fluid".

In psychology of perception

A major holist movement in the early twentieth century was gestalt psychology. The claim was that perception is not an aggregation of atomic

sense data

but a field, in which there is a figure and a ground. Background has holistic effects on the perceived figure. Gestalt psychologists included Wolfgang Koehler,

Max Wertheimer

,

Kurt Koffka

. Koehler claimed the perceptual fields corresponded to electrical fields in the brain.

Karl Lashley

did experiments with gold foil pieces inserted in monkey brains purporting to show that such fields did not exist. However, many of the perceptual illusions and visual phenomena exhibited by the gestaltists were taken over (often without credit) by later perceptual psychologists. Gestalt psychology had influence on

Fritz Perls
'

gestalt therapy
, although some old-line gestaltists opposed the association with counter-cultural and New Age trends later associated with gestalt therapy. Gestalt theory was also influential on phenomenology.
Aron Gurwitsch
wrote on the role of the field of consciousness in gestalt theory in relation to phenomenology.
Maurice Merleau-Ponty
made much use of holistic psychologists such as work of
Kurt Goldstein
in his "Phenomenology of Perception."

In teleological psychology

Alfred Adler believed that the individual (an integrated whole expressed through a self-consistent unity of thinking, feeling, and action, moving toward an unconscious, fictional final goal
), must be understood within the larger wholes of society, from the groups to which he belongs (starting with his face-to-face relationships), to the larger whole of mankind. The recognition of our social embeddedness and the need for developing an interest in the welfare of others, as well as a respect for nature, is at the heart of Adler's philosophy of living and principles of psychotherapy.

Edgar Morin, the French philosopher and sociobiologist, can be considered a holist based on the transdisciplinary nature of his work.

Mel Levine, M.D., author of *A Mind at a Time*, [13] and co-founder (with Charles R. Schwab) of the not-for-profit organization All Kinds of Minds, can be considered a holist based on his view of the 'whole child' as a product of many systems and his work supporting the educational needs of children through the management of a child's educational profile as a whole rather than isolated weaknesses in that profile.

In theological anthropology

In theological anthropology, which belongs to theology and not to anthropology, holism is the belief that the nature of humans consists of an ultimately divisible union of components such as body
,

soul
and
spirit
.

In theology

Holistic concepts are strongly represented within the thoughts expressed within Logos (per Heraclitus
),
Panentheism
and
Pantheism
.

In Neurology

A lively debate has run since the end of the 19th century regarding the functional organization of the brain. The holistic tradition (e.g., Pierre Marie) maintained that the brain was a homogeneous organ with no specific subparts whereas the
localizationists
(e.g.,
Paul Broca
) argued that the brain was organized in functionally distinct
cortical areas
which were each specialized to process a given type of information or implement specific mental operations. The controversy was
epitomized
with the existence of a
language
area in the brain, nowadays known as the
Broca's area
.
[14]

Although Broca's view has gained acceptance, the issue isn't settled insofar as the brain as a whole is a highly
connected
organ at every level from the individual
neuron
to the
hemispheres
.

Applications
Architecture

Architecture is often argued by design academics and those practicing in design to be a holistic enterprise. [15] Used in this context, holism tends to imply an all-inclusive design perspective. This trait is considered exclusive to architecture, distinct from other professions involved in design projects.

Education reform

The Taxonomy of Educational Objectives identifies many levels of cognitive functioning, which can be used to create a more holistic education. In authentic assessment, rather than using computers to score multiple choice tests, a standards based assessment uses trained scorers to score open-response items using
holistic scoring methods

.

[16]

In projects such as the North Carolina Writing Project, scorers are instructed not to count errors, or count numbers of points or supporting statements. The scorer is instead instructed to judge holistically whether "as a whole" is it more a "2" or a "3". Critics question whether such a process can be as objective as computer scoring, and the degree to which such scoring methods can result in different scores from different scorers.

Medicine

Holism appears in psychosomatic medicine. In the 1970s the holistic approach was considered one possible way to conceptualize psychosomatic phenomena. Instead of charting one-way causal links from psyche to soma, or vice-versa, it aimed at a systemic model, where multiple biological, psychological and social factors were seen as interlinked. Other, alternative approaches at that time were psychosomatic and somatopsychic approaches, which concentrated on causal links only from psyche to soma, or from soma to psyche, respectively.
[17]

At present it is commonplace in psychosomatic medicine to state that psyche and soma cannot really be separated for practical or theoretical purposes. A disturbance on any level - somatic, psychic, or social - will radiate to all the other levels, too. In this sense, psychosomatic thinking is similar to the
biopsychosocial model
of medicine.

Alternative medicine practitioners adopt a holistic approach to healing.

See also

- Buckminster Fuller
- Christopher Alexander
- Confirmation holism
- David Bohm
- Emergence
- Emergentism
- Gaia hypothesis
- Gestalt psychology
- Gestalt therapy
- Gross National Happiness
- Holistic health
- Holon

- Howard T. Odum
- Jan Smuts
- Janus
- Kurt Goldstein
- Logical holism
- Organicism
- Polytely
- Panarchy
- Synergetics
- Synergy
- Systems theory
- Willard Van Orman Quine

Notes

1. **^** According to the Oxford English Dictionary
2. **^** cf. Henri Bergson .
3. **^** Bertalanffy 1968, p.54.
4. **^** Finding My Religion San Francisco Chronicle, retrieved on March 2nd, 2010
5. **^** S. Wolfram, *Cellular automata as models of complexity*, Nature 311, 419 - 424 (1984)

6. **^** Shore, Bradd (1999) *Strange Fate of Holism. Anthropology News* 40(9): 4-5.
7. **^** Segal, Daniel A.; Sylvia J. Yanagisako (eds.), James Clifford, Ian Hodder, Rena Lederman, Michael Silverstein (2005). *Unwrapping the Sacred Bundle: Reflections on the Disciplining of Anthropology* . Duke University Press. http://www.dukeupress.edu/cgibin/forwardsql/search.cgi?template0=nomatch.htm&template2=books/book_detail_page.htm&user_id=11016434335&Bmain.Btitle_option=1&a

mp;Bmain.Btitle=Unwrapping+the+Sacred+Bundle
.

8. **^** anthrobase definition of holism
9. **^** Reconnecting with John Muir By Terry Gifford, University of Georgia, 2006
10. **^** Louis Dumont, 1984
11. **^** Wilkins, M., (1986) Oral history interviews with David Bohm, 16 tapes, undated transcript (AIP and Birkbeck college Library, London), 253-254.
12. **^** M. I. Sanduk, Does Society Exhibit Same Behaviour of Plasma Fluid? [http://philpape rs.org/rec/DSE](http://philpapers.org/rec/DSE)

13. **^** (Simon & Schuster, 2002)
14. **^** 'Does Broca's area exist?': Christofredo Jakob's 1906 response to Pierre Marie's holistic stance. Kyrana Tsapkini, Ana B. Vivas, Lazaros C. Triarhou. *Brain and Language*,
Volume 105, Issue 3, June 2008, Pages 211-219, http://dx.doi.org/10.1016/j.bandl.2007.07.124

15. **^** Holm, Ivar (2006). *Ideas and Beliefs in Architecture: How attitudes, orientations, and underlying assumptions shape the built environment*. Oslo School of Architecture and Design. ISBN 8254701741
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16. **^** Rubrics (Authentic Assessment Toolbox) "So, when might you use a holistic rubric? Holistic rubrics tend to be used when a quick or gross judgment needs to be made" [[1]](1)

17. **^** Lipowski, 1977.

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