

SUPERVENIENCE IN MEDICINE: AN ATTACKING OR COMPROMISING ONE?

Andres Soosaar

Intro

- Medicine is a complex issue which binds together in a certain way nature, mind, and society;
- Is it possible at all to find some common conceptual framework for different aspects and branches of medicine?
- Causal link has been a popular common motif in medicine, but how about supervenience to be there?

Supervenience

- *A set of properties A supervenes upon another set B just in case no two things can differ with respect to A-properties without also differing with respect to their B-properties.*

In slogan form, “*there cannot be an A-difference without a B-difference*” (the B. McLaughlin and K. Bennett supervenience overview in Stanford Encyclopedia of Philosophy);

- George E. Moore, British Emergentists, and Donald Davidson among others are important thinkers who started the thinking about supervenience.
- Supervenience seems to be today everywhere in analytic philosophy (or rather in fashion?)

Pioneers of supervenience

- G.E. Moore (1922) – “one of the most important facts about qualitative difference... is that two things cannot differ in quality without differing in intrinsic nature”
- D. Davidson (1970) – “Mental characteristics are in some sense dependent, or supervenient, on physical characteristics. Such supervenience might be taken to mean that there cannot be two events exactly alike in all physical respects but differing in some mental aspects, or that an object cannot alter in some mental respects without altering in some physical respects.”

Types of supervenience

- Weak supervenience: A-properties *weakly supervene* on B-properties if things that are alike in B-properties in any given world are alike in A-properties in that world
- Strong supervenience: A-properties *strongly supervene* on B-properties just in case things that are alike in B-properties, *whether in the same or different possible worlds*, are alike in A-properties.

Characteristics of supervenience

- Temporal symmetry versus asymmetry in case of causation;
- Spatial directedness;
- Subvenient properties determine supervenient properties but latter are not reducible to first ones.

How about supervenience in medicine?

- We'd stay in this presentation on bodily health and medicine and skip other more controversial or complicated issues, e.g. supervenience in ethics and mind-body issue;
- At first call, supervenience seems to be also a perfect concept for medicine; e.g. *“there cannot be a difference in health status without a difference a difference in body status”*

Aim to apply supervenience in medicine

The attempt to analyze the relation between health and disease in terms of supervenience may contribute to some general theoretical framework of medicine and gives possibility to test its coherence

What kind of entities are health and disease?

- Are health and disease properties of an organism or events in broader space of reality?

It is possible to find them as properties both organism and its environment.

Some almost trivial things about scientific medicine

Medicine can correct human (mal)functioning both in biological and social sense via intervention into existing biological (sic!) structure and functioning of the organism;

- Human being is a multilevel structure. It is very common to differentiate several levels of biological organization in it: physical microparticles, some chemical compounds, cells, tissues, organs, organ systems, the organism.

Methodological issues of scientific medicine

- Medical thinking is very much based on and filled in with causation. An important branch in medicine is and has been aetiology or causation of diseases;
- There are some general schemes how disease is caused by certain factor(s), e.g. the Henle-Koch postulates for infectious diseases and the Hill criteria for complex situations, e.g. connection between smoking and lung cancer.

Features of a leveled structure

- Different levels seem to express different properties, but not in isolated way, a higher level needs the support from lower levels;
- The higher level properties seem to emerge from lower level properties;
- The higher level properties tend to be more complicated or complex in character;
- Biological reductionism has been both influential and successful approach in modern medicine.

“Ways of traffic” in the leveled structure

- There are 2 main types of traffic -- ontological and epistemological traffic;
- There are interlevel and intralevel connections;
- Properties are result of certain emergence, determination, causation or appearance etc. from other (hopefully the lower level properties) properties;
- To understand properties one needs to study in terms of their nature and realization.

Relations in medicine

- The strong determinism is not a universal one in medicine and works only in some particular situations;
- The multiple realizability seems to be obvious in body-health issue.
- The probabilistic approaches give possibility to express some ontological features of an object without strong claim to be clear with essence of it.

Health-body supervenience

At first look it seems to fit nicely with medical knowledge, e.g. thinking about the concept of health, it supervenes well on some physical design of body. It works good in both approaches to health (health as lack of disease or a special mental quality of satisfaction) but its explanatory or discovering power seems to be not very high, especially in the case of health as satisfaction.

Disease-body supervenience

- If the concept of disease is inverse to the concept of health, their supervenience to body might be in some sense alike;
- If disease is something truly different, e.g. as a clear set or order of events, the supervenience is obviously there, but causation seems to be much powerful tool of explanation indeed.

How about analogies between health and mind?

- Supervenience can produce analogy between mind-body issue and health-body issue;
- Both mind and health realize within material and social context; changes both in mind and health supervene somehow on changes in contexts;
- Both mind and health have some normative diapazone;

Combination of supervenience and manipulability causation

If one combines supervenience with manipulability causation (*manipulation of a cause will result in the manipulation of an effect or if C is genuinely a cause of E, then if I can manipulate C in the right way, this should be a way of manipulating or changing E (J Woodward in SEP)*), the explanatory power and practical utility of an approach to the issue under investigation will clearly increase.

Summary: What to do with supervenience in medicine?

- Thus, pure supervenience provides not so much knowledge about nature of things, but rather ways of compromise or better intellectual adaptation how to be satisfied without that knowledge about nature of things.
- Supervenience fits much better with rather correlations as essential connections which in turn play a big role in the modern probability based medicine.
- Thus, supervenience in medicine is rather a compromising one in medical epistemology.

References

- McLaughlin, Brian and Bennett, Karen. "Supervenience", *The Stanford Encyclopedia of Philosophy* (Fall 2006 Edition), Edward N. Zalta (ed.), forthcoming URL = <http://plato.stanford.edu/archives/fall2006/entries/supervenience> , July 18, 2006
- Kim, Jaegwon. Supervenience, emergence, realization, reduction. In: *Oxford Handbook of Metaphysics*, edited by ML Loux & DW Zimmerman. OUP, 2003, pp 556-584.

Koch-Henle postulates (19th century)

- The microorganism is always found with the disease;
- The microorganism is not found with any other disease;
- The microorganism, cultured from one with the disease and culture through several generations, produces the disease.

Hill criteria (1964) – smoking causes lung cancer

- Strength
- Consistency
- Specificity
- Temporality
- Biological gradient
- Biological plausibility and coherence
- Experimental evidence
- Analogy