



Scientific Contribution

Strong holism, weak holism, and health

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Abstract. The health theories of Nordenfelt and Boorse are compared. Critical attention is focused on Nordenfelt's description of his theory as one of holistic welfare, contrasting with Boorse's analytical and statistical approach. Neither theory is found to give an entirely satisfactory account of 'health' in scientific medicine or common usage. Because Nordenfelt attenuates the ontological significance of organs and organ parts and simplifies the role of statistics, his theory is regarded as weakly holistic. Boorse underrates the importance of non-statistical evaluation. A mediating position, termed 'strong holism' is suggested as a way of integrating normative and statistical elements in a more adequate health concept.

Key words: disease, health, holism, normality, organs, statistics, values

Introduction

According to common intuition, there is some kind of affinity between the concepts of *health* and *normality*, both of which contrast with the concept of *disease*. What is the logical nature of these relationships? Is the relationship between health and disease analytical, such that the word, 'health', means the absence of disease (Boorse, 1977)? Or is it causal, as in Nordenfelt's (1987, 1993, 2001) theory where disease is a process that tends to diminish one's health? Are the concepts of health and normality statistical, or are they truly normative?

By criticising Boorse, Nordenfelt has stimulated the discussion of these matters in a way that is admirable for its analytical clarity. However, it has been suggested that the analysis tends to exaggerate the difference between Boorse's biostatistical theory and Nordenfelt's own holistic welfare theory. In a brief note, Täljedal (1997a) questioned the adequacy of Nordenfelt's health concept and sketched an alternative approach, called 'strong holism'. Following that idea, the two theories of Nordenfelt and Boorse are here compared and strong holism proposed as a reasonable, mediating position.

Nordenfelt's theory

In Nordenfelt's holistic action-theoretic welfare theory, health is viewed as the ability to achieve vital goals, i.e. those goals in life that are requisite for one's happiness to reach a minimum level.¹ Health

is not happiness, but a condition for happiness under accepted² circumstances. To be happy is a cognitive³ act (Nordenfelt, 1993, p. 172): 'P is minimally happy with life, if and only if P believes that every condition is fulfilled which is of high priority to him or her.'

Although Nordenfelt does not himself explicitly express the overall conclusion, it follows logically that *health is the ability of being essentially content with life*.

Two persons of the same physical status may well represent different degrees of health, if their vital goals are different. What decides the degree of health is the balance between one's ability on the one hand, and one's vital goals on the other.

The basic role played by the individual's own setting of his or her vital goals gives Nordenfelt's theory a subjective tinge.⁴ However, considering it subjective in this sense is not to deny the objectivity of the very facts that a person has his or her own subjective goals and a certain ability to reach them. This objectivity makes it possible for Nordenfelt (1993, pp. 103–112) also to define concepts of *subjective health*, the essence of which are feelings of wellbeing or beliefs about one's ability to reach the vital goals. These concepts of subjective health should not be mixed up with the concept of health, although the latter is based on the subjectivity of setting vital goals.

Nordenfelt argues that his theory is in opposition to the common health concept in scientific medicine. As doctors typically focus on the diseases of patients and not on their ability to become happy, disease appears to be a key concept in scientific medicine,

according to Nordenfelt (1987, p. 2). In contrast, Nordenfelt himself (1987, p. 108, 1993, p. 101) treats disease as a secondary concept and defines disease as a bodily or mental process that tends to compromise or limit health. Neither health nor disease is a matter of statistics (Nordenfelt, 1993, p. 95, 1993, p. 172).

Thus, the basic structure of Nordenfelt's theory is as follows: (1) the kernel meaning of 'health' in common usage rests on the concept of happiness; (2) *health* is the ability of being happy, i.e. the ability of being essentially content with life under accepted circumstances; (3) *diseases* are bodily or mental processes which tend to diminish this ability.

Boorse's theory

Already at the outset, Boorse (1977) differs from Nordenfelt in limiting his task to explaining what is meant by 'health' and 'disease' in medicine. Moreover, Boorse does not investigate the relationship between health and disease but starts by stating axiomatically that health is the absence of disease. 'Health' and 'disease' are then defined in parallel by reference to the concept of normality. To be healthy is to function normally, and to have a disease is to not function normally.

Boorse (1977, pp. 556–562) understands normality as the correspondence with an ideal species design, the content of which is determined by statistical analysis of the empirical distribution of properties in a reference group. When talking about human health and disease, the relevant reference group is the biological species, *Homo sapiens*, qualified with respect to sex and age. In his theory, disease statements are value-neutral and the conception of health is as value-free as statements of biological function (Boorse, 1977, p. 542).

Nordenfelt's view of Boorse' theory

Nordenfelt emphasizes two differences between himself and Boorse. Firstly, Nordenfelt considers his own theory to be holistic, in marked contrast to the allegedly analytical character of Boorse's theory. This terminology is meant to stress that Nordenfelt defines health by reference to properties on the individual's highest level of organization, i.e. by vital goals that presuppose mental and socio-cultural activities. Boorse, on the other hand, is said to emphasize the function of organs and organ parts. Secondly, Nordenfelt, as well as Boorse, regards Boorse's health concept as statistical and non-evaluative, whereas true evaluations form the basis of Nordenfelt's health

concept. Because of these differences, Nordenfelt labels Boorse's theory 'the biostatistical theory of health' (Nordenfelt, 1987, p. 16) and characterizes his own contrasting alternative as a holistic 'welfare theory' (Nordenfelt, 1987, p. 145). Most importantly, Nordenfelt (1987, pp. 23–33, 1993, pp. 89–92) holds that a biostatistical conception of normality cannot sustain an appropriate concept of health.

Discussion

General

Although the exact meaning of 'health' is a matter of debate, the promotion of health is generally considered a significant aim of clinical medicine. To make possible, or at least facilitate, effective communication between doctors on the one hand and patients, politicians and the general public on the other, the medical profession is in need of a health concept that is not fundamentally different from that of the medically untrained public. Therefore, it is worth comparing the two theories of Boorse and Nordenfelt, in spite of their being different in scope. The fact that Boorse is explicitly concerned with the concept of health as employed by doctors, while Nordenfelt takes a more general approach, does not make a critical comparison irrelevant. Such a comparison is here focused on the roles of holism, normative values, and statistics. A more comprehensive review of the two theories would be beyond the scope of the present paper.

According to Boorse's axiomatic definition of health as the absence of disease, it would be self-contradictory to assert that somebody both has a disease and is in good health. Nordenfelt squarely rejects this view. In consequence of the fundamental subjectivity of Nordenfelt's health concept, his theory permits the possibility of one's carrying a disease and being healthy simultaneously.⁵ Indeed, health is even claimed to be compatible with the bearing of a deadly disease, albeit a rare combination.⁶ To my intuition, on that point Nordenfelt is stretching the limit of subjectivity too far for a credible account of the kernel meaning of 'health' in both the language of doctors and in common usage. It should be remembered that a deadly disease could go on unnoticed for a long time, even for years. So, Nordenfelt's idea that a deadly disease is compatible with health cannot be defended simply on the ground that we are dealing with a very brief-lasting, transient phenomenon.⁷ Moreover, many patients with a known, long-lasting chronic disease, e.g. diabetes mellitus, are probably able to realize high-quality vital goals in spite of being aware of having a deadly disease. It seems strange to say that

such patients are as a matter of fact in good health, even though the treatment routinely aims at making them feel as if they are.

A well functioning health theory must probably employ both statistical description and evaluative normality. Thus, neither Nordenfelt nor Boorse seems to provide an entirely satisfactory analysis. The perception of the relationship between the whole of the individual (organism) and his or her (its) parts can be improved, as can the understanding of what constitutes normality in healthy humans. Boorse is probably wrong in maintaining that the health concept should be kept value-free. Nordenfelt is probably wrong in thinking that a theory of health and disease can do without statistical normality.

Weak and strong holism

Nordenfelt's description of his own theory as holistic is no doubt appropriate to a certain extent. But Boorse is also a holist, in the sense that he, too, presupposes that the individual has overriding goals in life. He illustrates the vital goals of man by mentioning classic aspects of speciation, such as survival and reproduction. Of course, such a reference to the central position of evolutionary theory in modern biology does not exhaust the set of vital goals on the plane of the individual and can be understood elliptically. People do have other important goals in life besides surviving and producing children. In this insight Nordenfelt is right. But so are doctors in general and, I suspect, Boorse too. This insight does not hurt Boorse's theory in any significant way. Neither his *de facto* holistic stance, nor his main emphasis on statistics, is dependent on the exact formulation or content of the vital goals. The important thing is that such goals exist as goals for the whole organism and that they can be empirically determined by investigating which overriding goals in life are as a matter of fact typical of people.⁸

In comparison with Boorse, Nordenfelt perceives the whole in a strikingly limited way. There is a tendency with Nordenfelt to view organs as being primarily of instrumental significance. I take this limitation to reflect a rationalistic underestimation of the ontological significance of organs and organ parts. For this reason Nordenfelt's theory may be described as weakly holistic. In contrast to this weak holism there is the strong holism of the medical world (Täljedal, 1997a, b).

The performance of the individual as an integrated whole of organs and organ parts is an absolute condition for health in scientific medicine. Integration is the very essence of physiology, and disturbances of integration are referred to as pathophysiological. In Swedish law, death is understood as the irrevocable

inability of the brain to coordinate the organs into an integrated body, not merely the irrevocable loss of mental functions. Nordenfelt (1987, p. 13) acknowledges that doctors are aware of the weakly holistic perspective of their patients. However, he does not quite seem to realize the meaning and fundamental importance of functional integration in the medical ontology of the human being, and so leaves out of sight the strongly holistic perspective.

Nordenfelt's perception of medicine prepares for the most severe criticism that could be attempted against Boorse and the medical profession, i.e. that medical science cannot speak about health without contradiction, and therefore, by implication, cannot speak about health at all. The contradiction is said to arise because it is typical of human beings to be inflicted with illness under certain circumstances.⁹ For example, if one is contaminated with certain bacteria, it is statistically normal to get a temperature, tender oedema, and diminished functional abilities, in other words illness or bad health. But statistical normality is Boorse's definition of health. Therefore, from Nordenfelt's point of view, the biostatistical theory would seem to be forced to say that one has good health when one has bad health. Nordenfelt's solution is to reject the statistical concept of normality altogether.

As an alternative solution, in better agreement with both everyday intuition and the professional views of doctors, it may be suggested that the concept of health is applicable to the whole of the organism as well as to its parts. The contradiction observed by Nordenfelt is thus resolved, as bad health on one level of organization is compatible with good health on an ontologically more basic level. Indeed, bad health on the level of the whole individual sometimes *requires* good health on the organ level. For example, inflammation and swollen lymph nodes is in part the expression of a healthy immune system, the normal function of which in the integrated whole is precisely to combat infections in this way (Täljedal, 1997a).

So, by 'weak holism' one can understand a conception of the whole that only refers to properties on the highest organizational level of the individual and holds that only such properties are essential for the concepts of healthy human being, normal human being or health. By contrast, 'strong holism' signifies an ontology that also regards organs and organ parts as important for the fixation of these concepts.¹⁰

Disease

If, for the sake of argument, one accepts Nordenfelt's health concept, it does not seem possible to define 'disease' in the way that he has proposed, i.e. as a

process that tends to cause non-health. Among the examples of non-health that Nordenfelt (1993, p. 97) discusses, there is an imagined person who suffers from severe unhappiness because of his or her inability to become an Olympic medallist. Suppose now that the heart and lungs of this person perform in a way that is average from a statistical point of view. It is then highly probable that it is precisely this normality that causes the inability of the person to reach his or her vital goal of becoming something so unusual as an Olympic medallist. How, then, are we to avoid the conclusion that normal blood circulation and respiration is a disease in this patient? As far as I can understand, this awkward conclusion can only be avoided by linking not only normality but also disease to some kind of statistical norm, a strategy that is explicitly and emphatically forbidden by Nordenfelt's theory:

A further important point here is that diseases are *not* defined in terms of their abnormality, be it statistical or otherwise. They are defined on the basis of their relation to health, which according to the holistic approach has other conceptual presuppositions than in the Boorsian biostatistical framework. (Nordenfelt, 1993, p. 95)

Statistical and evaluative normality

Nordenfelt holds that the kernel meaning of 'health' in normal language does not refer to statistics, and that the philosophical reconstruction of the concept of health should therefore not make use of such reference. Moreover, his criticism of Boorse's biostatistical theory tacitly seems to suppose that the formation of a statistical norm must necessarily be a rather trivial form of mathematical modelling. This assumption is a distinctly weak point in Nordenfelt's perception of medical science in general, and in his reading of Boorse – and, consequently, in the arguments for his own theory.

Each biological species exhibits its typical distribution of different property values, for example height, heart beat frequency, stomach acidity, and haemoglobin concentration in blood etcetera. For any species, an extensive list could be made of the typical value for each such property variable. When Nordenfelt criticises Boorse of being overly focused on organs and parts, he seems to assume that the measure of normality in medical science is precisely *only* this, i.e. a list of property variable values akin to those checklists of normal laboratory values that for practical purposes are sometimes used by clinicians. However, such an assumption represents a misunderstanding of the thought patterns of typical doctors and medical scientists, and, most likely, also of Boorse's inten-

tion. What medical science considers to be the normal width of variation in the function of individual organs and organ parts is *highly dependent on the understanding of how the organ parts cooperate to form a functionally integrated whole. This understanding is simultaneously a matter of description, of mechanistic theory, and of normative evaluation.*

This is so because descriptive data on individual organs and organ parts are interpreted by the help of a theoretical perspective of the organism as a whole, a perspective of design that presupposes that the whole organism has vital goals. A statistical description can rarely, if ever, provide any self-evident criterion as to where to draw the demarcation line against the zone of abnormality. It is a commonplace and easily realized fact that far from everything unusual is considered an unhealthy abnormality in medicine. In middle-aged and older people, red hair is probably much less frequent than high blood sugar values. Yet, we do not consider red hair a symptom of disease, whereas hyperglycaemia is a paradigmatic example of what counts as a symptom. The circumference of the head is measured in small children to detect any threatening hydrocephalus. If the circumference is much larger than average, one is worried. I have been told of a patient whose head was so big as to make it difficult for the infant to keep it upright at an age when most children do. Yet, this child was not found to have a disease, as locomotion, speech and mental activities ideal of design.

On the other hand, doctors regard many common variable values as abnormal, in spite of their being quite frequent, for example blood pressure and plasma cholesterol values above certain levels. Blood pressure and plasma cholesterol correlate with the risk of acquiring heart disease, *and it is a combination of statistics and genuine evaluation that decides the border between the normal and abnormal in such and similar situations.* A merely statistical description of the actual distribution of the risk factors simply cannot tell what should be considered a normal risk of acquiring heart disease.

So, the concept of normality in medicine is something much more than a conjunction of singular statements about the typical properties of organs and organ parts. For a correct understanding of normality one must add two things, both of which are founded in the regulatory ontology of strong holism: (1) the linkage of individual statistical variables to each other in more (e.g. Principal Component Analysis or Projection to latent structures; Wold et al., 1984) or less (everyday intuition) sophisticated multivariate models; (2) true normative values derived from vital goals.

A mediating definition of health based on strong holism

Against the above background, an attempt to encircle the concept of health in a way that improves on Boorse and Nordenfelt by proposing a position between them could be as follows.

Firstly, it is accepted that an individual is healthy if and only if he, she or it functions in a way that is normal for his, her or its species.

This Boorsian position corresponds to the language usage in everyday life and in professional medicine. However, to clarify the meaning of *normality*, it is necessary to add an explication that goes beyond everyday intuition. I suggest the following definition:

An individual is normal and functions normally if his, her or its statistical representation is positioned within a certain space – the space of normality – in a multivariate distribution of interactive variables describing organ parts, organs, integrated organ complexes, and the whole organism in a reference group of individuals. The border of the space of normality is conventionally decided upon by normative evaluation.

This definition does not tell how the conventional border of the multivariate space of normality is in reality fixed. That is in principle a question for empirical anthropology rather than for analytical philosophy.¹¹ As to the causal explanation why some people fall outside the space of normality and hence are not healthy, there are obvious possibilities, such as injury and malformation. But what about disease?

Without entering the classical debate of physiologism versus ontologism (Nordenfelt, 1987, pp. 151–173), it seems necessary to accept that ‘disease’ is an ambiguous term in both everyday language and scientific medicine. As realized by Nordenfelt, the word certainly carries the meaning of a cause and not merely the logical negation of ‘health’ or ‘normality’. For example, it is undeniably correct usage to say things like, ‘His bad health was caused by tuberculosis’. On the other hand, it is hard to accept Nordenfelt’s idea that having a disease is compatible with being healthy. In my mind, Boorse is correct in regarding having a disease as a logically sufficient condition for not being healthy.

This ambiguity of the word, ‘disease’, need not be harmful, but can probably be resolved in several ways. A straightforward approach is to analyse the meaning of ‘caused by’ in expressions of the kind, ‘His bad health was caused by tuberculosis’. That an individual has a disease implies that some of the interactive variables describing his or her organ parts, organs, integrated organ complexes, and whole organism have

abnormal values. According to scientific medicine as well as to the prevailing idea of people in general, those abnormalities have causes, by doctors usually termed ‘etiological’ or ‘pathogenetic’ causes. For example, the abnormalities in a patient inflicted with tuberculosis are caused by certain bacilli. An obvious way of understanding ‘His bad health was caused by tuberculosis’ is to equate it with ‘The interaction of his organ parts, organs, integrated organ complexes, and whole organism was deranged by tubercle bacilli in such a way as to instantiate tuberculosis’. Although pathogenetic causes are of many different kinds, an analogous interpretation should always be possible. For example, ‘The interaction of her organ parts etcetera was deranged by a genetic mutation in such a way as to instantiate breast cancer’.

The identity and operation of the pathogenetic causes are often obscure. In many situations, such as in patients presently diagnosed as diabetics, the typical causes have not yet even been identified. However, this lack of empirical information is not generally interpreted to mean that pathogenetic causes do not exist. On the contrary, both scientific medicine and contemporary general opinion favour the investment of great resources into research aiming at improving and widening our knowledge of such causes.

Notes

1. Although defined in terms of ‘minimal happiness’ (e.g. Nordenfelt, 1993, p. 172), health cannot reasonably well be understood as a limitation of happiness. I therefore take Nordenfelt’s expression ‘minimal happiness’ always to mean ‘at least a minimum level of happiness’.
2. Nordenfelt (2001), p. 68. Originally, it used to be ‘standard’ circumstances (Nordenfelt, 1987).
3. In the matured version of the theory, it is clear that being happy is not essentially a feeling, although happiness is seen as a disposition toward feeling happy (Nordenfelt, 1993, p. 53). This important distinction between feeling happy and being happy was not always as succinctly made, as indicated by the following passage (Nordenfelt, 1987, p. 91): ‘The criterion of whether a certain state of affairs is a vital goal of A’s is whether this state is necessary for the minimal intensity, frequency, richness and duration of A’s feelings of happiness.’
4. Although most individuals are thought to know what is in their interest, the vital goals need not always be intended (Nordenfelt, 1987, p. 89) or even consciously set (Nordenfelt, 1993, pp. 97–98). However, they must in principle be attainable by the person’s actions (Nordenfelt, 1987, p. 89). As it is a central idea in Nordenfelt’s theory that the vital goals can differ between individuals, it seems reasonable to say that the individual sets them, whether consciously or unconsciously.
5. For example: “‘Illness’ (as a general predicate applicable to a person as a whole) and “being ill” will in my own

theory be used as synonyms for “non-health” and “being unhealthy”. – Nor does the theory say that diseases, injuries and defects always entail or lead to illness. Latent diseases, insignificant diseases and certain diseases in an early period of their development can exist without affecting the ability of their bearer’ (Nordenfelt, 1993, pp. 95–96).

6. Nordenfelt (1996), p. 189. In this Swedish dialogue on the nature of health, Nordenfelt discusses how to characterize a patient who experiences full vigour when diagnosed to have a cancer that later turns out to be painful and fatal: ‘Hälsa är till och med som i detta fall förenlig med dödlig sjukdom. Jag har försvarat denna begreppsliga konsekvens med att det faktiskt gör det möjligt för oss att uttrycka viktiga fakta. . . . Men att en person har hälsan betyder inte att allt är bra med henne. Som vi sett kan den medicinska prognosen vara mycket dålig.’ I.-B. T.’s translation: ‘As in this case, health is even compatible with a deadly disease. I have defended this conceptual consequence by pointing out that it does make it possible for us to express important facts. . . . However, that a person is healthy does not mean that everything about her is all right. As we have seen, the medical prognosis can be very bad.’
7. Nordenfelt (1997a), p. 244; Nordenfelt (1997b), p. 247; Täljedal (1997b), p. 246.
8. Recognizing that a statistical definition of normality can in principle be applied to vital goals as well as to the physical properties of organs is not to advocate a strictly statistical theory of health. As discussed below (*Statistical and evaluative normality*), an element of conventional evaluation is indispensable for fixing the acceptable width of statistical distributions. This is not the least obvious when discussing the psycho-social and cultural aspects of human life.
9. Nordenfelt (1987), p. 30; Nordenfelt (1993), pp. 90–91.
10. ‘Organ parts’ should here be understood as comprising all the anatomical, microscopical, ultrastructural, molecular, and atomic components relevant to modern biological theory. The expressions, ‘weak holism’ and ‘strong holism’,

have been chosen with a view to the usual understanding of health as a predicate of individuals. This usage should not obscure the theoretical possibility of a wider conception of holism, and perhaps even of health, as an attribute of groups or societies of interacting individuals.

11. A similar comment could be made about the vital goals in Nordenfelt’s theory.

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