



## SPECIAL REVIEW

Helmuth Nyborg: *Hormones, Sex, and Society: The Science of Psychology*. Westport, CT.: Praeger (1994). Hardback. pp. 1–207. KR 580. ISBN 0-275-94608-8.

Nyborg is an internationally recognized expert on sex hormones, and the psychological effects they have on a variety of functions. This book really has two rather distinct missions. One, indicated by the main title, is to present to the reader the outcome of a life-time's work in this extremely important field. As such, it is well written, reads easily, and is very convincing. The second mission is indicated by the sub-title; the author uses his scientific work to support his arguments for the development of "the science of psychology", i.e. a rejection of "mentalism", and a purely reductionist physiological–hormonal analysis of behaviour. Most readers will applaud Nyborg's scientific work; many will have doubts about his philosophical excursions.

Taking the scientific aspect first, it appears that Nyborg is centrally concerned with sexual differentiation, its causes and effects. Sexual differentiation (SD), he points out, can be analyzed in terms of the "underlying physico–chemical processes selected for during evolution. SD refers to extensive aspects of autogenetic differentiation of the body, brain, intelligence, and personality, all of which lend themselves to an analysis at the intrasystemic level. In addition, SD plays a significant role in many aspects of social behaviour, which can be analyzed at the intersystemic level. SD shows up in all cultures though to a varying degree, and can be subjected to a physiological analysis in terms of geographically and climatically conditioned differences (the extrasystemic level)." This three-fold analysis is Nyborg's mission, and the rest of the book demonstrates in detail how such analyses can be carried out.

The topics covered are certainly numerous, and of considerable interest to psychologists interested in individual differences. Brain lateralization, human ability (particularly spatial ability), and personality are the main topics discussed, and there is no doubt about the importance of the findings. Much of his discussion is based on "hormotyping". Nyborg has found it convenient to androtype males into one of five groups: A1 (very low androgen) through A5 (very high androgen), with A3 (moderate androgen) as the average individual. Females are similarly estrotyped into one of five groups: E1 (very low estrogen) through E5 (very high), and with E3 (moderate) as the average individual. The plasma hormone concentrations are of course continuous, but for statistical purposes this typology makes good sense. Nyborg gives a Table (10.1) which makes numerous predictions for androtypes, and another (10.2) for estrotypes, relating to a great variety of functions, ranging from body measures to sociability, from number of children and life expectancy to intelligence (g), and verbal and performance abilities. A5<sub>s</sub> are the most sociable, A1<sub>s</sub> the least; E5<sub>s</sub> the most, E1<sub>s</sub> the least. Intelligence (g) goes the opposite way, with low A and E values doing best. And there are many more findings not included in the Tables, relating to alcohol consumption, smoking, drug usage, dieting, and personality dimensions P, E and N. It is impossible to discuss the numerous findings, methods employed, and arguments raised; clearly, the book must be read and studied in detail. There can be no doubt that Nyborg has made a lasting contribution to science. (I am not competent to judge the details of hormonal determination, and other technical issues, but experts assure me that Nyborg's methodology is perfectly orthodox.)

Nyborg's "physiology" argument is more difficult to assess because it is essentially philosophical (although he might demur on this point). There are three essential points of view which can be held concerning the nature of psychology. These are 'mentalism', of the Titchenerian variety; behaviourism, of the Watson–Skinner fundamentalist variety; and materialism–reductionism, embraced by Nyborg. He agrees with behaviourists in rejecting mentalism (including in this Freud and all his works), but differs from behaviourism (which tends to ban biological references as 'black box' explanations not belonging to a pure behaviour-oriented science) by assuming that *all* explanations for behaviour must be biological and hence reductionist (hence the neologism: physiology). Of course within the equilateral triangle having these three corners there are many possible combinations of mentalistic (cognitive), behavioural and biological causes and explanations; there is good evidence that all three have a place and belief, stressing one of them exclusively is essentially philosophical, i.e. arrived at on a logical, *a priori* basis.

I think most psychologists would agree that man is a biosocial organism, and that the biological aspect has been shamefully neglected and indeed rejected over the past 50 years, on political and philosophical grounds that simply disregarded available evidence. Whether the *cognitions* people obviously have can be *completely* explained in biological terms, and whether they are produced *entirely* as a consequence of behaviour are questions not yet settled by convincing experimental evidence. For the present I think the most reasonable position is one which does not on *a priori* grounds reject any of the three possible pillars which hold up one conception of causal elements in psychology, but seeks for evidence reducing this multiplicity of causes to a smaller number, and Nyborg's advocacy of just one single cause at the molecular level may turn out to be correct, in due course. But at the moment I doubt if we know anything like enough to make an informed choice. We should certainly push reductionist determinism to the limits of experimental expertise, but we are a long way from reducing *all* of human behaviour (including cognitions, emotions, motivation, etc.) to simple combinations of hormones, neurotransmitters, limbic systems, neurological structures, etc. Research into the connections between these and behaviour and mental states is vitally important, and most welcome if of the high quality of Nyborg's own contribution, but it does not and cannot settle the philosophical problem. The

short discussion Nyborg gives to introduce his concept of 'physiology' takes little account of the difficulties encountered by all attempts to arrive at a monotheistic solution. To be convincing a much more philosophically sophisticated account would be required to assure readers, and while Nyborg's own biosocial studies are in line with his beliefs, they do not seem to be difficult to integrate into a less restrictive system. The body–mind problem is not to be solved in a 20-page discussion!

Physicists had to accept the notion of a space–time continuum, bringing together concepts previously thought to be entirely different and separate. We may have to give up the Cartesian notion of separate entities of 'body' and 'mind', and accept a body–mind continuum. There is no doubt that so-called mental events, like stress, have bodily consequences, like cortisol emission, leading to immunological decline and ultimately to cancer. Similarly, bodily events, like Alzheimer's disease, have mental consequences. The notion of a continuum may sound unlikely, but so did that of a space–time continuum to those of use brought up on Newtonian ideas. Whatever the final verdict on Nyborg's philosophical ideas, this is an important contribution to psychology and neuroscience.

H. J. Eysenck