DAG O. HESSEN

Genetic Determinism

While not being the topic of the Biology Group at the CAS this academic year, the concept of biological or genetic determinism nevertheless has some relevance to the theme of the philosophy group, and it is thus tempting to bring this up for discussion in the CAS seminar series. The topic itself raises a number of associated questions on the meaning of both "genetic" and "determinism". I have no intention of fully exploring these concepts here, but I want rather to make some remarks on different understandings of the concept.

Surely the understanding of *determinism* is by no means straightforward. By claiming, in a mechanistic tradition, that everything is based upon causal links, one could argue for universal determinism (in the tradition of the search for "the theory of everything"), and thus contend that genetic determinism itself is rooted in a chain of physically determined events. It may be fruitful however to distinguish between some conceptual levels of determinism or indeterminism to see where genes fit in. One may draw a distinction between *hard determinism* in the Spinozan sense, where fatalism could be seen as the religious analogue. The more widespread *soft determinism* would argue for a causal link from A to B, but not from A to Z due to a series of unpredictable interactions of chaotic and indeterministic happenings. Within natural sciences, most discussions on determinism will be in this realm. Irrespective of the understanding of determinism, the issue at stake is to what extent recent insights in biology and genes may shed new light (or provide challenges) on concepts such as free will, rationality, morality and responsibility. The fact that *physical traits* are to a major extent rooted in genes is not very controversial, so the question is rather the role of genes for mental capacities and personality. While (some) biologists have been accused of advocating a deterministic view of individual personality, it is worth recalling that there is a strong philosophical as well as religious tradition for the belief in innate characteristics (e.g. Augustine and Schopenhauer, "once a thief, always a thief").

Professor Dag Hessen,
Department of Biology,
University of Oslo.
Group leader CAS 2003/04.

Since the mental has a physical basis, it should not be very controversial either to state that a number of mental attributes have a fairly obvious genetic causality. But what about personality then? In many ways the discussion of genetic determinism builds on the old controversy of nature versus nurture in humans where socio-biology and later evolutionary psychology traditionally emphasize inherited and evolutionary traits as key tools for understanding human acts and motives, the point of departure for the idea that individual destiny is "in the genes", in James Watson's (one of the discoverers of the DNA double helix structure) famous "Central Dogma". This dogma claims a one-way instruction from

gene to protein. Watson also phrased the famous "Once we believed that our destiny was in the stars, now we know that it is, to a major extent, in the genes". Since these claims were made, the interplay between genes and their products, and not least the interplay between genes have been further disentangled (yet still far from fully understood), and have not supported strong genetic determinism. First of all, there is no 1:1 ratio between genes and "products", most characteristics are influenced by a large number of genes in a complex interplay. This was not least obvious after the discovery that the human genome was made up of no more than some 30,000 genes as opposed to the previously assumed ~100,000.

Note that there are different levels of genetic determinism, the common or shared and the individual. One could thus speak of human nature as being like this or that, also there could be a kind of determinism assigned to sex, "race" or group, and of course there is determinism at the individual level. The strong belief in racial difference and the very belief that there existed such a thing as well-defined races in the 1920s and 30s build on a (wrong) assumption of ethnic determinism. The same can be said about female versus male capacities. Typically when female admission to the Faculty of Medicine at the University of Oslo was discussed in the 1880s, it was claimed that " … the female nervous system and strength would in general not be able to handle these comprehensive studies and the demanding mental work …". Today there are more than 50 % female students … Another example of sexual determinism can be drawn from the writer Bret Easton Ellis who in an interview in the newspaper Aftenposten in 1999 stated that " … men are aggressive, wild, active; this is rooted in their biology, their physiology. They are especially obsessed by the primitive aspect of life, it is about dominance …". If we accept that there is such a thing as "human nature", that is important, is this a fixed nature? Is there a "good" or "bad" nature, are we altruistic or selfish, and are there general constraints on human preferences due to in-built, evolutionary, genetic preferences?

The brief answer to these questions is that there surely is such a thing as human nature, but not *a* human nature. First and foremost we are extremely flexible, and while this flexibility must also be rooted in nature, it makes the search for stereotypes into a sport with a major risk of failure. Certainly some cultural universals may be identified, but nurture seems to be superimposed on nature in this regard.

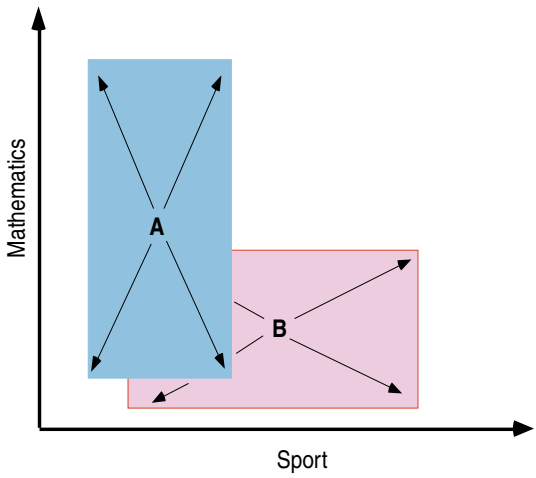
Now then, let us turn to the question of *individual* determinism. To what extent are physical and mental individual attributes fixed by genes. Are there genes "for" IQ as well as for athletic performance, are there genes "for" health and disease, genes for crime or care? I.e. can we really talk about genetic destiny? When it comes to physical attributes and health, the answer is – to a certain extent – yes. We have seen a boom in recent books with titles like "Your genetic destiny" and there are regularly articles in magazines and newspapers expressing the same message: there is indeed a genetic destiny. A number of chromosomal defects or gene variants (mutated alleles) have been identified that predispose us for certain types of illness, some fatal, others not, some with high likelihood, others with low. While some of these can be modified or even cured by life style or diet, there is nevertheless some kind of determinism (again depending on the definition) embedded in e.g. receiving three copies of chromosome 21, causing some 94% of all carriers of Down's syndrome. A large

number of other examples could be provided. The problem is, however, when this is transformed into some sort of general genetic fatalism: "There is nothing I can do, it's all in the genes". A strong belief in an individual genetic fate could, a priori, cause a corresponding lack of individual responsibility.

Perhaps the most dramatic manifestation of this kind of genetic destiny has popped up in the courtroom where we have seen (from the USA) examples of procedures where prosecuted murderers have been claimed innocent by the Defense since they came from families with "crime genes". While these arguments may seem far-fetched, there are examples of types of clearly inheritable traits that promote antisocial behaviour. Needless to say, however, this is a dangerous line of reasoning, and it contradicts the view of individual freedom and responsibility.

I have for amusement over time collected "Genes for …" headlines that regularly crop up, suggesting some sort of individual, genetic determinism for almost all kinds of disease or personality: "Genes for being a good mother", "Genes for faithfulness", "Genes for terror" and perhaps the best: "Genes for bad luck" where the absolutely indeterministic has been assigned genetic determinism. Well, genes *are* important, but not nearly as important as suggested by these headlines, whether or not the desk or the scientist is to blame.

Perhaps the most important aspect is that genes do not *prescribe* immoral or amoral acts, and are anyway no (strong) excuse for such acts (i.e. Moore's arguments on "the natural fallacy" stands firm). The message today is that genes and environment play in concert, it is not a matter of nature or nurture; both are needed to gain insight into human motives and acts. Genes "code" evolutionarily for mental capacity and flexibility that can override primary, biological goals. In a strict biological sense, humans are quite often highly irrational to the extent that we do not always try to optimize individual fitness.



For most of us, our genetic baggage certainly imposes some physical and mental constraints, but there is plenty of room for flexibility within the genetic frame. And the other way around, not even the very best "ski-genes" would be of much use in Africa - or the *potentially* new Einstein would probably not unfold his capacities growing up in the backyards of Rio. These arguments could perhaps be summarized in the figure above: along the axis of skills, there are some limitations that have a genetic causality. In the example above, A has more talent for numbers than sports and vice versa for B. Within these borders we can try to optimize our performance and/or explore our freedom and responsibility.