

Response to items on heritability book list

"Heritability estimation was first used in selective breeding in agricultural and laboratory settings where researchers have the ability to replicate varieties and locations. Indeed, when agricultural researchers compare varieties and make recommendations to farmers and when they select among varieties for the next round of crop trials, they do so on the assumption that the environmental factors will remain more or less unchanged. For observation of human traits, however, such replicability of varieties and environmental factors is not possible. This observation opens up the historical question of how such restrictive conditions were discounted or forgotten in the translation of heritability estimation from selective breeding to human genetics" (Taylor, 2006).

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Harriet Ritvo – "Animal Estate" (1987)

Deals with the way people interacted with their animals (mainly dogs, cats, horses, cattle) in 19th century England. There is a chapter called "Barons of Beef" that goes into the early breeding efforts of the "aristocratic and gentry fanciers" and the "...intelligence and manipulative skill of the men who actually produced the emblematic animals" (p.63). As an example, there is an interesting look at Robert Bakewell, a legendary stock breeder who died in 1795. Ritvo analyzes the diversity of discourses around human-animal relationships – "the discourses of cattle breeding and dog showing...corroborated human claims to superior status.." etc.

It's fascinating and can offer an historical "stage setting" for later works on more pedestrian selective breeding, but doesn't directly inform the question of the translation of heritability estimation to humans.

Page Smith and Charles Daniel – "The Chicken Book" (1972)

Another lively, humorous, well-written book that comprehensively deals with the chicken – "...historically, scientifically, anthropologically, and gastronomically..." There is a lot of information in the chapters that deal with breeding, including references to the Kimber Farms in California. Kimber Farms was the operation which quintessential model of scientific egg production. One of the interesting details about Kimber was the fact that in 1955 it established the Kimber Genetics Award, which carried a gold medal and \$2000 cash for the awardee. William Ernest Castle got the award in 1955, as did Sewall Wright, Alfred Sturtevant, Theodosius Dobzhansky, George Beadle, and John Haldane, in subsequent years.

Aside from showing the advantages of collaboration between a scientist (Charles Daniel) and a humanist (Page Smith) – their intention in writing the book together – it doesn't directly address the heritability question. It does provide insights on humans' uses of animals through time.

Garry Marvin – "Bullfight" (1988)

This is a detailed anthropological study of the bullfight – the nature and meaning of the culture of the *corrida*. There is a chapter on "The Fighting Bull" that talks about the selective breeding

that is done to produce these special animals. In a twist on the effort to quantify the exact contributions of genes vs. environment, Marvin says the following: “Although each ranch owner employs carefully controlled selective breeding to produce the best possible animal, there is a point past which human control is felt to be inoperative. Although it is relatively easy to breed for the physical type of animal it is very difficult to select for *bravura* (the behavioural quality of wildness), a quality which is essential for a good bull and yet is something which is not fully revealed until the animal is actually in the arena” (p. 90).

This is an interpretation of the bullfight (and its associated participants, rituals and practices) that touches only briefly on the mindset of selective breeders. Although quite interesting, I don’t see that it can inform your question very much.

Temple Grandin (ed.) – Genetics and the behavior of domestic animals (1998)

Could be useful. Contributing authors all present different aspects of how genetics influence behavior – from chickens and dogs to horses and cattle. The first chapter by Temple Grandin provides an overview of work in animal science. Interestingly, she states in the Preface that “Most principles learned by selection experiments in smaller animals apply to all animals” (p. ix). One paragraph later, however, she notes that “the genetics of a small animal can be precisely controlled for many generations in the behavioral genetics laboratory. ...[t]his precise control is not always possible in dogs, cattle, and other large domestic animals because each generation lives much longer.” It seems that the researchers do not have any problems with extrapolating, even though the precision of the controlled conditions is not the same!

The Politics of Heredity – Diane Paul (1998)

I found this book the most useful for writings on the social meanings of genetic fitness. Her historical articles are so detailed and well-written! The one entitled “The Origins of Behavior Genetics” has a very pertinent examination of the work that was done at the Jackson Lab in Bar Harbor. In it she shows that the work by John Paul Scott and John L. Fuller did not fulfill the expectation of the Alan Gregg of the Rockefeller Foundation. Rather than confirming Gregg’s intention in funding the study, they concluded; “The behavior traits do not appear to be preorganized by heredity. Rather, a dog inherits a number of abilities which can be organized in different ways to meet different situations... This means, in terms of human behavior, that the best sort of social environment is one which permits a large degree of individual freedom of behavior. Most individuals can reach desired goals if they are allowed sufficient freedom in the way in which they reach these goals” (p. 74).

A little earlier in this essay she notes that in late 1945, Gregg talked with R.A. Fisher in London, who apparently advised working with dogs in studying temperament and nervous disposition. Paul remarks “The assumption that one could (and should) generalize from the behavior of other organisms to humans would have appeared plausible to many of Gregg’s contemporaries” (p. 66).

Not on your list, but a book that I picked up at our library is “**IQ, Heritability and Racism**” by **James M. Lawler** (NY: International Publishers, 1978). I don’t have much biographical

information about him except that he is a Marxist philosopher. The book is a critique of Jensen and Herrnstein and in the Preface to the book, one Professor Roger R. Woock (State University of New York at Buffalo) says “I would argue that his [Lawler’s] chapter on heritability is the best explication of that concept now available for non-scientists” (p. x). I agree!

I also picked up “**Race Differences in Intelligence**” by **John C. Loehlin, Gardner Lindzey, and J.N. Spuhler** (San Francisco: W.H. Freeman, 1975). In their chapter on heritability, they mention Lewontin’s “more radical critique” of the concept of heritability, saying “he provides a number of hypothetical examples to show that genetic and environmental variance components estimated under a particular set of environmental conditions may not be at all predictive for a different environment...[nothing new there, but..] *many of his more dramatic examples, it should be noted, involve shifts to environments completely outside the range of those in which heritability was originally estimated*” (p. 99). My emphasis.

Taylor, P. (2006). Personal communication.