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Essay Review

Thoughts from a Psychologist

By

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The Neanderthal's Necklace: In Search of the First Thinkers by Juan Luis Arsuaga Four Walls Eight Windows: 2001, 344pp.

The Speciation of Modern Homo sapiens edited by T. J. Crow
Oxford University Press: 2002, 265pp.

Clinical psychologists don't often venture into the world of paleoanthropology, but the hypothesis that bipolar disorder evolved as an adaptation to Pleistocene climatic conditions, landed me in this fascinating and contentious arena. Bipolar disorder is correlated with a cold adapted build, and its symptoms are consistent with seasonal adaptation. For example, symptoms of major depression, such as slowing and loss of interest in usual activities, are congruent with the idea of energy conservation during long, cold winters, which was particularly important for women (their reproductive functioning requires sufficient body fat). The increased social and goal-directed behaviors of hypomania and mania facilitated accomplishment of tasks necessary for survival during the short period of fair weather. If bipolar disorder evolved as an adaptation, how, where, and when did this occur? Although the most likely ancestral candidate for bipolar disorder might seem to be Neanderthal, the most cold adapted species known, genetic analysis makes that unlikely. The intriguing possibility remains that bipolar disorder was common among them. Excluding Neanderthal leaves two ancestral sources for bipolar disorder. Either it evolved among an ancient people who intermixed with the most recent migration of *Homo sapiens* from Africa, or it evolved among a subset of the latter living in glaciated areas of the Old World. When the genes responsible for vulnerability to bipolar disorder are identified, they may help us sort out our evolutionary history. Seeking further enlightenment, I eagerly turned to these new books.

The title, *Neanderthal's Necklace***,** subtly expresses Arsuaga's view that Neanderthal is a parallel human group that, "lived much as the Cro Magnons – our ancestors did – worshiping, socializing, and hunting," to quote the dust jacket. The book is refreshing and charming

after exposure to heavy-fisted Anglo-Saxon debates about Neanderthal. Arsuaga co-directs the largest Neanderthal dig in the world, at the Sierra de Atapuerca in Spain where a new species, *Homo antecessor*, was also discovered. There, too, is the Sima de los Huesos where many human skeletons were found in a deep shaft far into a remote cave. How did they get there? After carefully considering alternatives, Arsuaga concluded that they died of starvation and were placed there 300,000 years ago, which he characterizes as the first known human funerary practice. As the name, *Homo antecessor,* suggests, Arsuaga thinks them antecedent to our own species, our last common ancestor with Neanderthal. Arsuaga's positive views of the intelligence of Neanderthals and other archaic humans are persuasive. In thinking about intelligence, it is well to acknowledge that we humans tend to discount the faculties of any creature unlike ourselves, whoever we are, and we distance ourselves from our shared roots with creation. This error may impede objective scientific thinking. Invidious comparisons of so called racial intelligence come most readily to mind, but here is another, less obvious example. Reluctance to see humans as subject, like animals, to the environmental influence of light persisted into the 1970s. This false idea retarded our understanding of the role of seasonal changes in light in the pathogenesis of bipolar disorder and seasonal affective disorder.

The Speciation of Modern Homo sapiens, edited by T. J. Crow, a psychiatrist known for his work on the etiology of schizophrenia, brings together experts from such diverse fields as paleoanthropology, archaeology, genetics, and brain sciences, to consider how and when we came to be as we are today. Was our evolution gradual, or did it happen suddenly? Was there a single speciation event, or are more attributes involved, such as a modern package? If a single speciating event occurred, did it happen as Crow proposes? The contributions to the book are excellent and successfully inform an interdisciplinary audience. I especially appreciated the essays of Stringer, Tattersall, Mellars, Corballis, and Bickerton, but Crow's disciplined imagination dominates.

The authors focus on a problem posed by the extreme form of the "Out of Africa" theory (that we descend solely from peoples of a recent African migration): how could so much happen so fast? Crow proposed a solution in his contribution, "Sexual selection, timing and an X-Y homologous gene: Did *Homo sapiens* speciate on the Y chromosome?" Crow suggests that speciation to modern *Homo sapiens* was accomplished by a change on the Y chromosome that increased brain lateralization and concomitant language skills among males. Further, speciation was greatly facilitated by female selection of these highly verbal males. He summarized his ideas in this way: "A theory of the speciation of modern *Homo sapiens*, that a single gene played a critical role in the transition from a precursor species, is founded upon the following. (1) The premise that hemispheric asymmetry is the defining feature of the human brain and the only plausible correlate of language. (2) An argument for a specific candidate region (the Xq21.2/Yp11.2 region of homology) based upon the reciprocal deficits associated with the sex chromosome aneuploidies, and the course of chromosomal change in hominid evolution (supported by a weak linkage to handedness). A gene (Protocadherin XY) identified within this region is expressed in the brain with the potential to account for a sex difference. (3) A particular evolutionary mechanism (sexual selection action on an X-Y-linked gene) to account for species-specific modification of what initially was a saltational change (in this case a chromosomal rearrangement). These postulates relate to the case of modern *H. sapiens*; on the basis of the recent literature it is argued that (3) has general significance as a mechanism of speciation (p 197)."

Crow is to be congratulated for his courage and energy in pursuing systematically an important idea that is specific and testable. Regarding the theory, Michael Corballis, an expert

on handedness and brain laterality, wrote, "It is possible, but by no means proven, that a laterality gene had a small part to play in producing this change (p 148)." The "change" Corballis refers to is the cultural explosion manifested in Europe 40,000 years ago, which was characterized by cave paintings, burials, personal decorations, and advanced tool making.

Crow's line of thinking seems destined to improve our understanding of how we came to be as we are, but it isn't totally convincing. First, the assumption that the modern cultural thrust is solely attributable to language seems questionable; rather, language seems a necessary but insufficient condition. The sine qua non of such creative productivity is appetite, not aptitude (to borrow from Plomin), and likely depends on development of dopaminergic systems in the prefrontal cortex. Second, Crow suggests that evolutionary processes were greatly accelerated by female selection of highly verbal males. However, if we extrapolate from the behavior of our species during historic times, it is unlikely that females usually chose their mates freely.

These two books, *Neanderthal's Necklace* and *Speciation of Modern Homo sapiens***,** so different in style and opinion, are exciting contributions to the development of our knowledge, if not by saltation, then by gradual accretion.

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