

Book Review of *Social DNA: Rethinking Our Evolutionary Past*

M. Kay Martin

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On the front cover of Martin's *Social DNA: Rethinking Our Evolutionary Past* is an illustration of a huddled group of *H. erectus* children and adult females, all looking with bemusement or interest at something in their immediate environment. The picture does not show the object of their interest, but to their rear is depicted an environment that some evolutionary views of human origins would likely interpret as the arid African savannah upon which the males of the group hunted or foraged for food. On this standard view, as Martin describes it, the females of the group would likely be understood to have dispersed from their original patrilineal, patrilocal bands to join another one sufficiently distanced genetically. Alternatively, Martin would have us look again at the picture and instead imagine a rich, lacustrine environment in which these humans subsisted on aquatic flora and fauna. She would likely further draw our attention to the possibility, if not likelihood, that the females of the group instead constituted a matrilineal, matrilocal band in which their energetic strategies, including alloparenting, could be more easily fostered for the care of altricial young. This is the basic picture of the alternative paleo-ecological view of human social origins and evolution that Martin presents in her book. It is an alternative that we should seriously consider in light of both the evidence that she reviews and the compelling synthetic argument she offers. Lest prospective readers of her book suppose that her arguments offer "a boon to feminist doctrine, a reaffirmation of the goddess, or the mirror of precapitalist society," they should know that Martin succinctly states that "they are none of these" (p. 232).

Martin is perfectly explicit about her theoretical approach and assumptions as she frames her view of human evolution. She lays out the basic tenets of the modern evolutionary and sociobiological theories pertinent to her argument, and she argues that humans are essentially a eusocial species (in contrast to a superorganism). The eusocial adaptation is evidently where the biological and sociological intersect for Martin, for "the reproductive success of ancestral humans was not only enhanced by, but *reliant on* their ability to forge cooperative relationships and function effectively within social groups" (p. 7; original emphasis).

There are several interlocking conceptual threads that are essential to Martin's argument, including Plio-Pleistocene paleoecology, nutritional ecology, life history, encephalization, behavioral plasticity, epigenetics, "social DNA", hominin kinship, and female philopatry. These are

undoubtedly historically complex facets of human evolution that are challenging to sort through, but her overall argument interrelates each across the seven chapters of her book. She is first concerned to discern the social origins of human families (Chapter 2), and this leads her to analyze signature hominin traits (Chapter 5), as well as the ecological context in which *Homo* emerged (Chapter 3). Differences in energetic and reproductive strategies between the sexes consequently implicate human anisogamy (Chapter 1), while differences between male and female reproductive strategies are related to life history patterns, encephalization, and the evolutionary roles of kinship (Chapters 6 and 7). Martin also pays special attention to early human diet (Chapter 4), finding it fundamentally opportunistic and equally accommodating of both terrestrial and aquatic fauna.

There are two primary organizational themes of Martin's account that illuminate the connections manifest among the topics of the book's chapters—namely, Plio-Pleistocene paleoecology on the one hand, and epigenetic evolution on the other. First, she claims that the Plio-Pleistocene transition is where the ecological context of human social origins is to be found. She observes, for instance, that local or migratory populations of *H. erectus* adapted to considerable environmental and habitat variability across Africa and Eurasia. The corresponding variable adaptations could have only been possible via an "essential plasticity" by which these early humans could "calibrate their socio-economic strategies with changing conditions" (p. 70). This view indeed presents a challenge to the single habitat hypothesis, which assumes that the savannah grassland was the only ecological context of early *Homo* evolution. Rather, Martin favors the paleo-ecological reconstruction that anticipates a diet that included key lacustrine food sources, the lipid profiles of which would have facilitated encephalization by meeting the expensive metabolic costs and nutritional requirements of increasing amounts of brain tissues; she observes that female energetic strategies would have certainly favored these kinds of resources. She further claims that the nutritional ecology of early humans was in turn reflected in their emerging social strategies that favored multi-male-multi-female breeding populations in which reciprocal cooperation and allocare could develop.

Second, Martin draws on recent developments in evolutionary theory that recognize the potentially significant effects of epigenetics on human evolution. She suggests that genetic imprinting and the transgenerational inheri-

tance of learned information defined the broad contours of mosaic brain evolution. In fact, both imprinting and inheritance would have been adaptive premiums because brains: (i) rely on imprinted genes for their development and higher functions, and (ii) need to be capable of plastic responses to environmental changes (pp. 182–183). While Martin argues that both maternal and paternal modes of epigenetic influence are equally important for brain maturation, she places special emphasis on the former mode of imprinting. This, she argues, is due to the virtually exclusive maternal postpartum care devoted to highly altricial offspring (pp. 184–185). Hence the alternative social scenario of female philopatry in human evolutionary origins. Incidentally, it is this sexually biased aspect of epigenetics in relation to the evolutionary brain mosaic that constitutes the crux of Martin's core concept, namely, social DNA, which entails a major place for the role of imprinting and plasticity. "Neurological specializations accompanying the evolution of the hominin brain," she explains, "emancipated our genus from reliance on predominately hardwired responses to subsistence and reproductive challenges, providing a broader repertoire of flexible behaviors with which to adapt to changing environmental conditions" (pp. 124–125).

Martin's project is commendable, for it sheds both critical and synthetic light on a wide range of sources, while attempting to present a unified evolutionary view of human sociocultural origins. However, I consider three inter-related issues with her account, all of which revolve around kinship. First, Martin's analysis of the origins of hominin social structures, including kinship systems, leads her to suppose that she might "unravel the tangled web and long-standing debate among cultural anthropologists and sociobiologists on the antecedents ... of kinship systems" (p. 188). The use of the term 'cultural anthropologist' in this disciplinary context, however, is problematic because it does not pertain to cultural anthropology at large, but only those cultural anthropologists who work within the overall evolutionary framework that structures her own account. This latter vein of cultural anthropology often includes advanced quantitative approaches to the social and biological features of kin selection. Indeed, the title of her book—"Social DNA"—says it all, and her definition of plasticity

underscores the sociobiological emphasis, namely, "the product of a complex gene-environment interaction whereby the phenotypic expression of genes may be affected by social learning and modified at the molecular level without changing the underlying DNA" (p. 125). This sociobiological aspect of plasticity, even if unproblematic in principle, is hardly the sort of subject matter in which many, if not most, cultural anthropologists take any interest.

Second, Martin's characterization of kinship as "social technology" seems to entail a dubious use of the term 'technology', which otherwise has a strong materialist connotation. If the concept of technology is supposed to entail the means (not necessarily strictly material, then) by which an end is achieved (e.g., reproductive success), then perhaps the extended use of the term in the social context would stick. In my view, however, the term is redundant at best. Indeed, Martin in fact defines social technology in terms of social organization, strategies and networks, and her functional view of kinship as a system of social *rules* – not technology – to optimize reproductive success only underscores the gratuitous use of the term. The descriptive terms "organization," "strategies," or "rules" suffice for accounts of socially mediated reproductive success.

Finally, Martin assumes at the outset that the overall pattern of human evolution takes the form of a "braided stream," "the various branches of which periodically diverged, crossed over, and reconnected throughout the Pleistocene" (p. 12). The braided stream, in her view, is a model of gene flow and speciation, but she cites no authority on the matter and nowhere offers an explicit application of the model in her project. In fact, the braided stream model may be hard pressed to accommodate her additional assumption of multilevel selection operating via common kinship relations (p. 14). The best-case scenario may be that any braided structure of multilevel selection is extremely complex, and that Martin is only scratching the surface of the implications of the combined assumptions.

That said, Martin has written a cogent and compelling book that students, experts, or interested lay readers alike may find worthy of their attention either as an introduction to human evolution or as a theory of human evolution to be further developed, criticized, or challenged.