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Review of "Catching Fire: How Cooking Made Us Human"

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Review of *Catching Fire: How Cooking Made Us Human* by Richard Wrangham (New York, Basic Books, 2009, 309 pages); and *Finding Our Tongues: Mothers, Infants and the Origins of Language* by Dean Falk (New York, Basic Books, 2009, 240 pages)

What makes humans unique? Why and how did humans come to be different from other animals in ways that we relate to our environments and each other? The distinctiveness of humans as a species has been a subject of study by philosophers and scientists for as far back as we have historical records, and certainly longer. Richard Wrangham and Dean Falk, both accomplished anthropologists, have each written a book presenting a novel theory on how and why the human lineage (a group of primates known as hominids) developed characteristics that distinguish us from other animals.

In *Catching Fire: How Cooking Made Us Human*, Richard Wrangham argues that the discovery of fire and cooking freed our human ancestors once and for all from an arboreal existence and led to a patriarchal social system and a sex-based division of labor. In *Finding Our Tongues: Mothers, Infants, and the Origins of Language*, Dean Falk contends that the evolution of bipedalism (upright walking on two legs) and concomitant changes in infant development favored enhanced mother-infant vocal communication, which eventually led to human language, music, and art. The key traits that are the focus of each theory—technology, in the form of the use and control of fire, and language—have long been heralded as features that make humans unique. Both works build on existing theories, but go a step further in incorporating novel perspectives, attempting to mold together comprehensive, unifying explanations for a suite of human traits.

In *Catching Fire*, Wrangham focuses on cooking as an innovation that allowed the evolution of large brains. According to Wrangham, the earliest members of the lineage leading to modern humans (species placed in the genus *Homo*) discovered the uses of fire for cooking, for warmth, and for security, and eventually learned to manage and produce it. With fire, humans no longer had to sleep in trees as protection from predators and could transition to a completely terrestrial existence. With fire for cooking, many foods (like starchy tubers and meat) were made softer or less toxic and easier to digest. Humans became physically and physiologically adapted to feeding on cooked foods. Changes in the gastrointestinal tract evolved allowing the bodies of early hominids to allocate more resources to energy-intensive brain growth and maintenance. Wrangham argues that adaptations found as early as *Homo erectus*—a species of modern human ancestor that appeared shortly after 2 million years ago—reflect this shift to use of cooked foods. Wrangham further attributes male-female pair bonding (monogamy) and sex-based division of labor in humans to cooking. Cooked food is such a high quality, localized resource, he contends, that a male must protect a female from aggressive attempts to steal her food. On the other hand, a male needs a female to cook for him because male hunting activities are time-consuming, and once hominids adapted to cooked food it became impossible to efficiently process and digest enough raw foods for survival.

In *Finding Our Tongues*, Falk proposes that the origins of human language (a protolanguage) appeared early in hominid evolution as a mechanism to reassure infants. According to Falk's "putting the baby down" hypothesis, a form of baby-talk or "motherese" developed as a means to substitute, in part, for nearly constant physical contact between mother and infant found in many

primates. The evolution of bipedalism led to several changes in hominid anatomy and development that prevented infants from being carried and held continuously. As the foot was modified for bipedalism it became unsuitable for grasping, reducing the ability of all hominids to climb and baby hominids to independently cling to their mothers (as nonhuman primate infants do). Changes to the pelvis and a smaller birth canal linked to bipedalism favored infants born less fully developed (and thus more helpless) to facilitate delivery. The solution to soothing a fussy infant, which would need to be placed on the ground as the mother foraged for food? Rhythmic vocalizations with distinctive patterns of stress, tone, and pitch that served as a “verbal touch” by the mother. Motherese is found in all humans, although its expression is culturally influenced. The patterns of transition from incoherent babbling to fully-fledged language in children are also universal and aided by features of motherese. Building on ontogenetic evidence, Falk suggests that this prosodic motherese formed the evolutionary basis for human language and was the impetus for music and even visual art—hallmarks of humanity.

The strength of both works is that the authors attempt to incorporate evidence from a variety of disciplines and lines of current research. However, the nature of the topics requires speculating well beyond what paleontological, archaeological, biological, and behavioral evidence can solidly demonstrate. We cannot observe those moments in prehistory when a hominid uttered its first meaning-filled phrase or track generations of social changes accompanying reliance on cooked food.

The most compelling aspects of Falk’s arguments stem from support that elements of motherese mirror developmental precursors to language and parallel qualities of music. It is also clear that anatomical and developmental changes associated with bipedalism and changes to hominid brains would require shifts in infant care strategies. It is easy to accept that frequent and prosodic vocalizations and gesture combinations (a protolanguage) paved the way for human language to emerge. The novel aspect, and crux of Falk’s hypothesis—that this protolanguage was an adaptation to deal with mother-infant physical separation—is intriguing, although difficult to establish. It hinges on the existence of a significant period after which hominid infants lost the ability to grasp, but before a baby sling was invented. How difficult a task is the invention of a baby sling, a simple wrap of leather or cloth that can hold a baby against a mother? Given the complexity of tool use observed in modern great apes, and the likelihood that such tool skills also characterized early human ancestors, this is a significant question. The value of motherese is also contingent on the availability (or lack) of group members beside the mother to act as care-givers and infant-carriers (allomothers) to soothe distressed infants. If someone else can hold the baby, it does not have to be put down. Just as importantly, even if motherese currently exists as a mechanism to comfort infants and assist with language acquisition in children, it need not have preceded the evolution of language. Motherese may have been a secondary use for an emerging language ability in hominids. Falk does not address how or why modern human language developed after the appearance of this motherese-based protolanguage, although she doesn’t really propose to do so. As Falk writes in the Preface, “The key to understanding the origins of language does not lie *after* the development of protolanguage, some two million years ago, but *before*—in the mysterious transition between our early ancestors’ divergence from other primates, five million to seven million years ago, and protolanguage’s first appearance” (p ix).

Wrangham presents data from scientific research on nutrition and digestive processes, as well as more eclectic anecdotes of human survival on different diets (e.g., the tribulations of raw

foodists), demonstrating that processed and cooked food is easier to digest than raw food. Once food has been prepared and heated, energy (calories) can be more efficiently and completely extracted. In addition, there has been substantial study on gastrointestinal tract anatomy linking the size and structure of particular organs to different types of diets. Thus, the argument that consuming cooked food would allow for smaller gastrointestinal organs (which humans do have relative to other animals of similar size) and provide more energy for growing a larger brain can be supported. The additional step that Wrangham takes, linking an increasing dependence on cooked food to sex-based labor division and a male-dominated social system, is more problematic.

Wrangham presents pair-bonding between males and females as a direct result of a division of labor in subsistence activities in early hominids (which itself is not well demonstrated), and the pair-bonding is equated with *marriage* (a cultural practice)—links that are certainly not obligatory. The complexity of human cultural variation in terms of marriage systems, gender-based social interaction, and subsistence activities does not obviously support a simple, universal interpretation that women are trading cooked food for male protection. The cross-cultural patterns Wrangham does note seem trivialized: “The contributions [of wife and husband] might involve women digging roots and men hunting meat in one culture, or women shopping and men earning a salary in another” (p 136). And, while Wrangham frequently refers to common chimpanzees as a model for the evolution of hominid social interactions, he ignores data on female chimpanzee tool use and hunting that would counter some of his arguments. He also mentions only in passing the social system of bonobos. As close relatives of common chimpanzees that do *not* display patterns of male aggression and dominance fundamental to Wrangham’s argument, the bonobo is an exception that needs explanation. The social components of Wrangham’s cooking hypothesis reflect the main components of an earlier “man the hunter” hypothesis, with the woman not just gathering plants to supply food for her mate, but cooking, too. There is also insufficient evidence of control of fire before the last few hundred thousand years to support Wrangham’s timeline for certain hominid adaptations to be reliably credited to cooking.

Both *Catching Fire* and *Finding Our Tongues* take holistic anthropological approaches; in support of their respective theories, Wrangham and Falk have integrated evidence from studies of nonhuman primates in captivity and field settings, especially chimpanzees, ethnographic research on modern groups of human hunter-gatherers, and other relevant research from various fields, such as neuroanatomy, nutrition, and psychology. However, Falk does a better job of providing the context for why such comparisons are valuable, and discussion of their limitations. Falk also provides a brief and basic, but critical review of how natural selection works. As both books are in essence works on human evolution, the process of natural selection must be clear to readers.

The trick for any book presenting specialized research to a general, popular audience is achieving the right balance between making the content accessible without oversimplifying. Falk’s writing in *Finding Our Tongues* is understandable and engaging; she provides good explanations for technical terminology and specialized concepts generally throughout book. The text is organized, and the chapters progress in a way that builds a case for Falk’s theory. In contrast, *Catching Fire* seems to struggle in finding the right tone; terms or concepts are sometimes introduced without sufficient framework to be well understood from the book alone. Both books gloss over some significant debates in anthropological research that are relevant to evaluating the theories. An issue for the scholarly reader and lay person alike is usefulness of annotations. *Catching Fire* includes notes at the end of the volume that elaborate on points or indicate sources, but within the chapter

text there are no numbers to indicate a point of reference for the annotations. It is difficult to link a specific note with chapter contents. *Finding Our Tongues* has similar annotations, but these are numerically referenced within chapters, thus immensely more useful.

Catching Fire and *Finding Our Tongues* put forth novel twists on theories of the evolution of distinctively human technology and language, which are essential subjects for anyone interested in the philosophy and science of human origins. Each book makes a good pitch, but readers who want a more comprehensive analysis of the theories and supporting evidence should read the original scholarly articles in which these ideas were presented, and the expert commentary by other researchers that follow (Falk, 2000; Wrangham et al. 1999). Both Wrangham's and Falk's theories are, without doubt, thought-provoking, and will certainly stimulate continued discussion and research.

Falk D. 2004. Prelinguistic evolution in early hominins: Whence motherese? *Behavioral and Brain Sciences* 27:491-541.

Wrangham RW, Jones JH, Laden G, Pilbeam D, and Conklin-Brittain N. 1999. The raw and the stolen: Cooking and the ecology of human origins. *Current Anthropology* 40(5):567-594.

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