

Hunters in a Farmer's World: ADHD and Hunter Gatherers

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Abstract

This paper considers the contemporary disorder ADHD as an evolutionary adaptation. After critiquing evolutionary psychology and psychiatry I discuss two evolutionary models of ADHD emphasising hyperactivity and impulsiveness and aggression respectively. I conclude by discussing the implications for child education

Keywords: Adaptation; Psychology; Psychiatry; Hyperactivity

Introduction

The field of evolutionary psychology has grown significantly in the past two decades. According to Brinkman [1], evolutionary psychology is one of the fastest growing fields in psychology. It is a theoretical approach to psychology that attempts to explain useful mental and psychological traits—such as memory, perception, or language—as adaptations, i.e., as the functional products of natural selection. An adaptation is a trait that developed in the course of evolution as a result of the mechanism of natural or sexual selection. These adaptations are transmitted genetically and can be anatomical or psychological. In the case of psychological adaptations, the selected genes help to form specific circuits in the brain. Thus the behaviours contributing to the most to successful reproduction will be selected. It is of interest that Darwin himself wrote about evolutionary psychology in that he suggested that like any other trait, human mental faculties are the outcome of evolution by natural and sexual selection and suggested these mental faculties should be understood in light of common descent [2].

Explanations deriving from evolutionary psychology have often attracted criticism in terms of post hoc storytelling and the fact that evolutionary hypotheses are held by its critics to be unfalsifiable. A frequent critique of EP is that its hypotheses are difficult or impossible to adequately test, challenging its status as an empirical science. Nevertheless we would argue that evolutionary psychology plays a central role in transforming psychology from a largely atheoretical collection of findings to a discipline which accounts for why the components of the mind/brain have the designs they do. Edouard Machery [3] concludes:

“Evolutionary psychology remains a very controversial approach in psychology, maybe because skeptics sometimes have little first-hand knowledge of this field, maybe because the research done by evolutionary psychologists is of uneven quality. However, there is little reason to endorse a principled skepticism toward evolutionary psychology: Although clearly fallible, the discovery heuristics and the strategies of confirmation used by evolutionary psychologists are on a firm grounding.”

Furthermore evolutionary explanations have been invoked to make predictive hypotheses which have been subsequently empirically confirmed [4]. Included are diverse areas as social exchange and cheater detection [5], foraging and sex differences in spatial ability [6], race encoding as a by-product of coalition encoding [7] and postpartum depression as an adaptation to reduce investment in the newborn in the context of limited resources [8].

Evidence deriving from both anthropology and archaeology

suggests that the human species diverged from forebears by living for a few million years in hunter-gatherer societies where foraging was essential. Resources may often have been scarce (or at least only intermittently plentiful), and deficits were common. Despite this, human culture and society have changed significantly in the last 10,000 years, more rapid by far than the pace of evolution of the human genome. A lag in remodelling the genome implies that our species' brains still retain the propensity to adapt to environmental features as these were before the emergence of recent civilizations [9]. Thus, to understand behavioural repertoire of modern-day humans, consideration of our ancestral environments (Environment of evolutionary adaptation; EEA) is important.

From an evolutionary biological perspective, some mental disorders are better viewed as an adaptive response to early pathogenic environments and/or reflect the optimization of brain function to some environments at the cost of poorer response to the demands of other environments. One critique of the scientific base of evolutionary psychology pertains to the fact that the environment of evolutionary adaptation (EEA). EP often assumes that human evolution occurred in a uniform environment, and critics suggest that we know so little about the environment (or probably multiple environments) in which *Homo sapiens* evolved, that explaining specific traits as an adaptation to that environment becomes highly speculative.

The discrepancy between the modern environment and the human EEA serves as the theoretical foundation for understanding the ultimate aetiology of chronic diseases such as diabetes, atherosclerosis and depression [10-12]. They are commonly called ‘diseases of modernity’. If the mismatch between contemporary and historic lifestyles adequately explains increasing lifetime risk of depression in the modern-industrialized world, then depression should be considered a disease of modernity as well.

Prehistoric and Modern Day Hunter Gatherers: Problematic Relationships

By studying present-day hunter-gatherer societies as possible analogues of early humans, evolutionary psychologists attempt to

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evaluate their hypotheses. This evaluative method assumes that modern-day hunter-gatherers are sufficiently similar to humans on the African Pleistocene savanna. It also assumes that all modern hunter-gatherer societies are homogenous. Testart [13] notes that hunter-gatherers appear to be the most ancient of so-called primitive societies—the impression that they preserve the most archaic way of life known to humanity, that characteristic of the whole of the Palaeolithic. The relation between existing and past hunter-gatherer societies is however problematic. Researchers look to existing hunter-gatherer societies for clues as to how hunter-gatherers lived in the EEA. Unfortunately, the few surviving hunter-gatherer societies are different from each other, and they have been pushed out of the best land and into harsh environments, so it is not clear how closely they reflect ancestral culture [14]. It is likely that our Pleistocene ancestors, like the sample of hunter-gatherer societies discussed by anthropologists such as Kelly [15] or Gurven and Kaplan [16], lived in diverse habitats, engaged in diverse economic activities within the rubric of hunting and gathering, had diverse social structures, met with diverse biotic and abiotic environmental challenges to survival and reproduction, and dealt with diverse hostile and harmonious relations with conspecifics outside of their natal groups or communities.

In man the hunter, Lee and DeVore [17] claimed the hunter-gatherer lifestyle -- including division of labour between the sexes, food sharing and use of stone tools for hunting - characterized 99 percent of human cultural history over the past 2 million years. In many cases, they contend, hunter-gatherer groups have cultivated foods and raised livestock part-time for thousands of years and were avid traders long before their first contacts with Europeans in the 16th century. Today they are best described as “commercial foragers” who adjust their hunting and gathering strategies to meet the trading requirements of more powerful neighbours. Few anthropologists now believe there are hunter-gatherers who have lived totally isolated from outside influences. But critics of traditional ethnographic studies, such as Headland and Reid, contend these groups provide at best a limited view of prehistoric behaviour patterns. Others, such as Lee, say hunter-gatherers often maintain their basic social organization through long periods of contact with outsiders and can provide important information about the evolution of human culture.

Evolutionary Psychiatry: Psychopathology as Adaptation

It is possible that some DSM-defined mental “disorders” plausibly arise from an adaptive response to early pathogenic environments (trauma, neglect), while others result from the optimization of brain function to early environments that are inconsistent with the demands that the child must meet in later environments. Evolutionary explanations account for distal rather than proximal causes of these disorders. Mayr and Tinbergen recognised that every trait needs two different kinds of explanation: a proximate explanation of how it works; and an evolutionary explanation of how it came to be the way it is. The focus of biological psychiatry however has been on proximate mechanisms with generally little interest in evolutionary explanations of fitness. From an evolutionary perspective depression for instance may have functioned to signal distress or may have been an adaptation that causes the affected individual to concentrate his or her attention and focus on a complex problem in order to analyze and solve it. Below we provide one example of how a modern day hunter gatherer group can be used to confirm a hypothesis in evolutionary psychiatry—thus arguing that modern day hunter gatherer societies may act as a

natural laboratory to confirm /disconfirm the findings of evolutionary psychiatry/psychology.

ADHD: The Hunter-Farmer Hypothesis

The focus here is on a prevalent child disorder: ADHD. In the United States it is diagnosed in 2-16 percent of school children [18]. The question arises as to why the genes for ADHD persist given its maladaptive nature in contemporary society. Evolutionists propose that the human mind has been shaped over the course of evolution by natural selection. Humans have adapted to specific ways of the environments and the challenges posed by them. Recently, ADHD has been viewed by some authors as perhaps having had beneficial qualities in our evolutionary past as well as in current Western culture [19,20]. One theory is that in the distant past when we lived in ‘hunter gatherers societies’ some of the characteristics now included under the ADHD umbrella might have been helpful both for the individual and for the community. The ability to rapidly scan the environment and act quickly would have been advantageous for the social group. Features of ADHD including impulsiveness, hyperactivity and transient concentration would have been advantageous to the hunter in a hostile environment [21]. Such hyper-vigilance would have been extremely beneficial for hunting. As environments changed these qualities were no longer needed. It became more important to have self-control and problem solving capabilities.

Widespread formal schooling and teaching are fairly recent inventions of the past few hundred years. While our hunter gatherer ancestors faced social pressures requiring them to focus attention to learn and practice complex foraging and hunting skills, the nature of the social and education demands were qualitatively very different for those we now face. Today we specialise in narrowly defined skills. Hunter gatherers are more likely to be generalists requiring a broad variety of subsistence and social skills. ADHD is usually diagnosed in those children who have trouble focussing properly in school and in adults in their work or lifestyle requiring focussing in particular regimented ways. ADHD in the past was unlikely to have been not much of a problem and perhaps even an asset.

The phenomenon of ADHD as an adaptation has been examined by Hartman [22] stated: ‘When the condition (ADHD) is so widely distributed (above the mean). Inevitable questions arise: Why? Where did ADD come from?’ The answer is: people with ADD are the leftover hunters, those whose ancestors evolved and matured thousands of years in the past in hunting societies’.

He first proposed the hunter versus farmer theory of ADHD in 1995 as a contrast to the medical view of ADHD deriving from a damaged brain. For him the constellation of behaviours which we call ADHD at one time were adaptive behaviours. Hunter attributes gave way to farmer attributes as society developed from nomadic hunter gatherers to permanent settlements. Human evolution failed to keep pace with the modern world. One study suggests that behaviours inappropriate in a classroom or adaption to learning were related to behaviour once helped to adapt to and to overcome their environment.

Some work has examined the genetics of ADHD [23-25]. There is a large heritable component in ADHD, around 70%, suggesting that genes play a role in its aetiology. The question arises as to why natural selection has not removed the genes from the underlying ADHD from the human population. One gene associated with this disorder is the dopamine receptor D4 (DRD4 alleles of which change the sensitivity of a sub type of dopamine receptors that are expressed in the pre frontal

cortex). The 7R (ADHD associated) allele of the DRD4 gene is peculiar. It evolved about 45,000 years ago and was then positively selected for. Chen et al. reported that population currently practising nomadic lifestyles have higher frequencies of the 7R ADHD associated alleles than sedentary populations [26].

Eisenberg et al. [27] extended this research among a group of pastoralists known as the Ariaal living in Kenya. This group traditionally herds camels, cattle, sheep and goats, live in the desert and do not remain in any one place long term. While many Ariaal continue this traditional lifestyle more recently a sub group have become less nomadic settling in one location. These authors analysed the DRD4 genotype of 150 adult Ariaal men, half from the nomadic group, and half from the settled group. The nomadic men who had the 7R ADHD associated alleles were less underweight than nomadic men who did not have the ADHD alleles. Among the settled men the reverse was true. Those with the ADHD associated alleles were slightly more underweight than the men without the ADHD alleles. These results concur with previous findings associated DRD4 with migration patterns.

While genetic factors appear to impact prevalences of ADHD, there is some evidence that environmental factors are important here, particularly the importance of play. Gray [28] argues that children who are given more freedom in their own education and lives no longer need ADHD medications. He has argued the high rate of ADHD may be related to the decline in vigorous outdoor play. Learning self-control and emotional regulation induced by all forms of social play seems to be a perfect counterforce to impulsivity, hyperactivity and lack of emotional control that characterises ADHD [29].

ADHD and Aggression

A second theory postulates that hyperactivity was related to aggression and thus led to a competitive advantage in terms of resources. In the current cultural climate, those with ADHD are more likely than most to develop aggressive behavior [30]. The high-energy, active behavior associated with ADHD similarly elicited aggression early in human history. One situation in which aggression has been postulated to have been useful was summarized by Leakey [31]. The extinction of *Homo Neanderthalis* appears to have been caused by *Homo sapiens*, but there are two possible explanations proposed. The first is that *Homo Neanderthalis* was indirectly out-competed in a struggle for resources, and because *Homo sapiens* had a slightly higher rate of reproduction, they, in effect, 'crowded' *Homo Neanderthalis* out of existence.

A second explanation is that Neanderthals may have been killed by *Homo sapiens* migrating northward from Africa into the European continent. Archeological evidence indicates that Neanderthal technology was not comparable with that of the *Homo sapiens* living at that time or even earlier (in Africa and the Middle East). As the African *sapiens* pushed northward, they would have been in direct competition with the Neanderthals for access to food supplies. As has often been the case, this conflict over resources might have resulted war. In this case, a fierce, energetic human with reduced inhibitions would have been ideal. In these situations the traits of what today we might refer to as ADHD might have been advantageous.

Schooling

Psychologist Peter Gray, argues that ADHD is essentially a failure to adapt to the conditions of modern schooling:

"From an evolutionary perspective, school is an abnormal environment. Nothing like it ever existed in the long course of evolution during which we acquired our human nature," Gray wrote. "School is a place where children are expected to spend most of their time sitting quietly in chairs, listening to a teacher talk about things that don't particularly interest them, reading what they are told to read, writing what they are told to write, and feeding memorized information back on tests."

This may have implications for child education. Some children may not be appropriate for mainstream education where sitting still for long periods is an expectation. Those who are unable to do this may be labelled with ADHD.

Conclusions

While the two theories outlined above suggest alternative pathways to the development of ADHD (compared to biomedicine) they remain speculative. Genetic examination of hunter gatherer communities (especially those who have recently become sedentary) may provide important clues to support theories deriving from evolutionary psychology. In depth ethnographic studies play an important part in confirming these theories.

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