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## Spontaneous Development of Hunting-like Behavior in a Juvenile Human: A Case Study

Hunting played a crucial role in the evolutionary success of our species: as specialized hunters, humans were able to spread all over the world, becoming the most widespread terrestrial mammal as early as 40,000 years ago (Burenhult). But is human tendency to hunt at least partially innate (i. e., genetic) or entirely learned?

This question is extremely important for understanding human history and evolution — for example, for solving the controversy about the precise role of hunting (as opposed to scavenging) in the life of early humans (Domínguez-Rodrigo) — but it has never been specifically addressed by scientific research. Studies of hunting behavior in humans have mostly focused on adults (Lee and DeVore; Nitecki and Nitecki; Bissell et al.; Bird et al.); on cultural acquisition of such behavior by children growing up in hunter-gatherer societies (MacDonald); on social, economic and developmental importance of children's hunting in such societies (Jones et al.; Walker et al.; Hewlett and Lamb; Crittenden et al.); or on environmental factors influencing hunting success (Collins). Innate predisposition for such behavior has never been demonstrated, and is often presumed to be absent by researchers, as evidenced by the fact that it is not even mentioned as a possibility in the most detailed overviews of relevant subjects (Harding and Teleki; MacDonald; Hewlett et al.).

On the other hand, the presence of a “hunting instinct” in humans is often mentioned as self-evident in popular literature, usually as a justification for hunting (see, for example, Ortega y Gasset). The most detailed argument to that effect was made by Caras, who wrote an entire book arguing that “the will to hunt, the desire to hunt, lies deep. It is, and I do believe that, inherent in man.” Causey quoted Caras and wrote that “the urge to kill may be viewed as an original, essential human trait... a desire that has been developed and reinforced over millions of years.” She insisted that for humans, hunting is a manifestation of a “killer instinct.” However, Causey’s statements were criticized as baseless and inconsequential by Bekoff and Jamieson, who noted that her paper had multiple methodological flaws, that there was no solid scientific evidence for instinctive predisposition to hunting in humans, and that the question is irrelevant to the discussion of the morality of non-subsistence hunting in the modern age.

Causey was not the only author to equate hunting with killing and to claim (explicitly or implicitly) that both are manifestations of the same instinct. Many others (see, for example, Ardrey; Wrangham; Wrangham and Peterson; and the more complete bibliography in Sussman) postulated the existence of a “killer instinct,” which is supposedly present in humans (and chimpanzees), and is responsible for both intra- and interspecific violence carried out by both species, particularly by males. The idea actually goes back to the 18th century (Burnet), although at that time the term “instinct” was not yet in use and people spoke of the “beastly nature” of man. These views were criticized by Sussman as being constructed on various unproven assumptions and circular arguments rather than solid evidence, and constituting a popular myth rather than a scientific theory; however, he did not question the synonymizing of hunting and killing on which such constructs are based.

Many proposed assumptions about the role of hunting in human evolution have been based on studies of other extant hominids (see, for example, Stanford 1996; Pickering). However, the existence of a possible instinctive basis of hunting behavior is as uncertain in apes as it is in humans. In all extant non-human hominids known to hunt — chimpanzees (McGrew; Newton-Fisher), bonobos (Hohmann and Fruth), and orangutans (Hardus et al.; Buckley et al.) — such behavior differs sharply between populations, suggesting cultural acquisition (Rapaport and Brown). On the other hand, hunting is regularly practiced by all well-studied populations of bonobos (Hohmann and Fruth) and chimpanzees (Newton-Fisher). Some individual chimpanzees have developed novel hunting behaviors, such as hunting human children (Cohen). There are published records of hunting in captive chimpanzees (Shumaker et al.), but it is unknown whether the apes involved were captive- or wild-born, and such records are very rare, possibly due to the lack of hunting opportunities in captivity. Hunting does occur in captive-raised macaques and capuchin monkeys (Steven Green pers. comm.). There is also an unpublished observation of a captive-raised orangutan hunting pigeons (George Lacy pers. comm.), but it is unknown if the ape has had an opportunity to learn this behavior from wild-born conspecifics.

Proving that hunting behavior in humans is always culturally acquired would require extensive research. But proving the opposite does not: even a single case of spontaneously acquiring such behavior without cultural transmission or immediate reward would be sufficient proof that the tendency to hunt is innate at least in some humans.

Below I describe such a case, showing that many elements of hunting behavior can manifest spontaneously in a juvenile growing up in complete isolation from other hunters, in an environment where such behavior has no adaptive value. Irrespective of the sample size, these observations clearly demonstrate that hunting behavior is innate in some individuals.

## Materials and Methods

**Study sites.** I was born on 17 May 1969, grew up in downtown Moscow (Russia), and spent summers in a small town of Monino, 30 km east of Moscow (55°50'N 38°11'E), until the age of 12. The part of Moscow where I was growing up had extremely impoverished fauna (a few bird, rodent, and invertebrate species); large parks with more diverse faunal assemblages were at least an hour away by public transportation. Monino was partially surrounded with boreal forests and open habitats with fauna typical for the region, except that large birds and mammals were almost entirely absent. At the time, both locations were considered relatively safe for a child: crime levels were very low or perceived as such due to the absence of crime reporting in state-controlled media, and there was no dangerous wildlife other than feral dogs.

**Study subject.** I grew up in a complete isolation from people involved in any kind of hunting or hunting-like behavior (such as fishing, birdwatching, or nature photography), although gathering behavior in the form of gathering wild mushrooms and berries was a popular pastime in Monino. My father was an avid butterfly collector, but I did not meet him until the age of 12 due to my parents divorcing around the time of my birth, and was unaware of his hobby. I did not meet any biologists, hunters, or amateur naturalists until the same age. No one among my relatives or friends had any interest in wildlife, although some of my friends eventually developed such interest under my influence (see below). Due to the extreme shortage of books about nature in the Soviet Union, such books were unavailable to me until the age of 6, and those describing the fauna of European Russia became available only at the age of 8. The only context in which I was introduced to the idea of hunting was in fairy tales, where hunter characters were never central to the story, and I do not remember having any interest in these characters or the concept of game hunting. Thus it can be stated that any hunting-like behavior shown by me at early age had developed spontaneously.

**Information gathering.** I started keeping written notes about wildlife I encountered at the age of 4, and some of these notes have survived until recently. My mother, who was amused, surprised, and sometimes worried by my hunting-like behavior, has very good

memories of the timing of its development, while I have clear recollections of particular “hunting” successes (see below).

## Results

*Emergence and development of hunting-like behavior.* I first showed interest in surrounding wildlife at the age of 3 (before learning to read), and by the age of 5 I spent every day in summer looking for wild animals in surrounding forests. During other seasons I spent a lot of time looking for birds in city parks and (weather permitting) for invertebrates in vacant lots and lawns around our city residence. Until the age of 7 I was mostly interested in invertebrates, since they were much more numerous and easy to catch; I started a “scientific” collection of insects at the age of 6. Later my interests broadened to include vertebrates, as well as observing animal behavior in the wild. By the age of 12 I was entirely focused on scientific research; at that time I started systematic observations of a particular species which were eventually summarized in a peer-reviewed paper (Dinets 1995). My mother and grandmother accompanied me at first, but starting when I reached the age of 5 they gradually allowed me to roam on my own, since I had good navigational skills.

The level of my emotional involvement in this behavior was remarkably high. I would sometimes keep visiting a remote location for many days and even weeks, hoping to capture a particular species I once saw and missed. Although usually I returned home on time, once I was so carried away trying to capture a dragonfly that I came home eight hours later than expected, causing serious distress to my family and, upon my return, some painfully excessive application of traditional parenting techniques by my mother. Such extreme motivation is remarkably typical for “real” hunters of young age: as Darwin wrote in his autobiography while recalling his school years, “I do not believe that anyone could have shown more zeal for the most holy cause than I did for shooting birds” (44).

I enjoyed finding, catching and observing insects and other animals, but didn’t like killing them. At that time scientific entomology in the Soviet Union was almost entirely collecting-based; my dislike of the process was one of the main reasons for switching to vertebrate zoology and, in my adult scientific career, for specializing in research on behavioral ecology and conservation, where killing animals or subjecting them to heavy suffering is seldom required. This dislike was not limited to interspecific killing: neither as a child nor as an adult did I feel any desire to kill conspecifics for the sake of it.

***"Hunting" patterns.*** I did not use the animals I found for food or any other practical purposes, and did not experience a shortage of protein or other food during my childhood. Still, I devoted huge amounts of time and energy to looking for animals, often spending 8-12 hours per day "hunting." Moreover, during the first years I always tried to capture the animals and bring them home, even if only to release them later; this clearly suggests that for me it was an expression of a hunting instinct, not just nascent interest in wildlife observation or science (if such things are even possible in a 3 year-old). My behavior was remarkably reminiscent of carnivorous mammals that hunt despite not needing extra food, such as domestic cats bringing their kills to the place of residence (Woods et al.), although the analogy could be superficial. Obvious in retrospect, the similarity of my behavior to "real" hunting did not occur to me until I was older, probably about 7 or 8. This behavior was very different from gathering (of wild mushrooms and berries) in which I regularly participated: during "hunting" I was looking for large, spectacular-looking or uncommon animals, rather than large numbers of common ones, and the thrill of chasing and capturing them was an important component of the "hunt."

At first all my "hunting" was conducted within ~3 km from home; learning to ride a bicycle at the age of 5 did not have any effect on the size of that territory. At the age of 9 I felt a sudden urge to explore unfamiliar areas, and expanded my summer "hunting" area to ~15 km radius. At the same time, I began to travel to forests outside Moscow during other seasons, learning the art of snow tracking and other relevant skills (mostly by myself, as any literature on the subject was extremely difficult to obtain). The next increase in "hunting" radius did not take place until the age of 12; at that age I also met my father and other amateur and professional naturalists for the first time.

Although I did not invent or make traps at that time, I readily took advantage of "traps" already available, such as bright light sources or holes dug up for future placement of utility poles.

My search pattern was not random. I had a very good memory of all locations where I had found particularly interesting animals (I still remember many such places almost 40 years later, even though I have not visited Monino since 1986), and tried to plan every day's route in such a way that as many such locations as possible could be re-visited. Some such places were promising locations for a reason (birch trees leaking sap, strong light sources attracting insects at night, forest ponds), but others were not. I was well aware of the fact that many wildlife encounters happened randomly, and in most cases there was no particular reason to expect them to happen again at the same location, but

still tried to visit these locations again and again. Over time, repeated visits to the same locations often produced new interesting findings, so the pattern reinforced itself.

**Influencing others.** None of the children I knew until the age of 12 had developed such behavior spontaneously, but some of my friends became interested in looking for insects and other wildlife under my influence, and one eventually became a professional biologist. In the latter case it took a surprisingly short time (just one day spent looking for solitary wasps on a sandy hillside) to trigger the sudden interest that later became a life-long pursuit.

**Discussion.** Although this unintentional study had minimal sample size, this is irrelevant, because even a single case proves a possibility. My experience clearly shows that hunting-like behavior can be developed by human children spontaneously in isolation from other hunters, even when it has no obvious adaptive value.

The self-reinforcing habit of repeatedly visiting locations where successful hunts have taken place, even if such locations are not different in any perceivable way from the surrounding habitat, is often present in adult hunters. American birdwatchers refer to this self-reinforcement as the Patagonia Picnic Table Effect, after an unremarkable location in Arizona that has produced many sightings of rare birds simply because it is frequently visited by birdwatchers (Kaufman 196-197). During my conversations with tribal hunters from various ethnic groups (Machigenga in Peru, Mbuti in DRC, Kichwa in Ecuador) they acknowledged routinely using such search patterns, and even mentioned having traditional beliefs justifying it. Mansi hunters of Western Siberia used an elaborate system of tree trunk markings to mark locations of successful hunts; it was prohibited to kill the same species at the same location, but hunting for other species in such places was encouraged (Fedorova).

Spontaneous development of hunting-like behavior, although clearly not a universal trait in humans, is not unique, particularly rare, or abnormal. A case virtually identical to mine is famously described by Durrell, also autobiographically. Durrell initially developed such behavior in a very different social environment, but also in complete absence of possible role models. An informal survey of professional zoologists and amateur naturalists ( $N=25$ , excluding people who have grown up in the West or in post-Perestroika Russia, where nature-themed books and TV documentaries were widely available) revealed that many of them have had similar early experiences, in many cases also clearly spontaneous and with very early onset. First manifesting avid interest in finding and catching small animals occurred at ages 3-5 ( $N=8$ ) or 6-9 ( $N=7$ ); later onset

was reported only by two responders. This can happen to children of either sex. The behavior is contagious, although not all people are susceptible to such influence. After many years of accompanying me on my “hunts” and being very compassionate about my interest in wildlife, my mother still does not share it. On the other hand, my wife had no interest in wildlife whatsoever until meeting me at the age of 24, but quickly became infected, and is now a passionate wildlife photographer. Under exterior influence, “hunting” tendencies can be manifested particularly early. My daughter became acutely interested in animals of all sizes at the age of 8 months, and started to enjoy looking for them in the forest at night at 12 months. At 18 months, animal names and sounds make up at least a half of her ~60-word vocabulary.

If the tendency to hunt is innate, why doesn’t it spontaneously manifest itself in all humans? It is quite common for innate behaviors to be highly variable when they are no longer maintained by selective pressure. For example, domestic cows differ in their ability to defend calves from predators, with some individuals showing strong antipredatory response and others lacking it completely (Flörcke et al.; Flörcke and Grandin).

Of particular interest is the evidence that the tendency to exhibit hunting-like behavior spontaneously is inheritable, possibly as a simple Mendelian trait. It is very likely that I inherited it from my father, despite not meeting him in person and not knowing about his interest in collecting and studying insects until the age of 12. Many zoologists and hunters have told me that some of their children fully shared their interest in wildlife, while others lacked it completely. But to further explore this possibility a rigorous study with larger sample size and well-defined criteria would be required. Such a study would also be required to find out if there are any sex-related differences in exhibiting such traits. It is a common belief that males are more likely to possess them, and in many cultures hunting is a predominantly or exclusively male occupation; there are also important exceptions (Goodman et al.; Bird and Bird), suggesting that the association of hunting and masculinity might be transmitted culturally rather than genetically. Interestingly, although hunting is practiced predominantly by males in all chimpanzee cultures studied to date (Stanford 1995), there are hunting methods practiced predominantly by females (Pruetz and Bertolani; Pruetz et al.).

My experience clearly shows that a “hunting instinct” is not synonymous with a “killing instinct.” I possess the former and not the latter. Some people do have personality traits that have been called the “killer instinct,” “sadistic tendencies,” “murderous psychopathy,” etc. For example, certain hunters, particularly those who

practice “canned hunts” (shooting of animals in enclosures), derive more pleasure from killing animals than from chasing and finding them (Bronner). Indeed, it has been shown that animals killed by trophy hunters often serve as subconscious proxies for human males (Dahles). Some serial killers feel an uncontrollable urge to kill conspecifics (Ressler and Shachtman), while many other humans find killing others enjoyable (Bourke). But the possible existence of a real “killer instinct” and its moral implications are outside the scope of the present paper.

As for the “hunting instinct” in the narrow sense, its existence in some or even all humans does not justify unnecessary hunting (Bekoff and Jamieson). We now live in a world where the possibility of fully sustainable hunting is an exception rather than a rule, and have learned to follow that instinct in less destructive ways, such as birding, wildlife photography, and catch-and-release fishing. New substitutes for hunting, such as mammal-watching and recreational use of trail cameras, are being invented all the time and can be no less (arguably more) challenging and rewarding than “real” hunting (Dinets 2015). The recent explosive popularity of Pokemon Go game, which allows players to hunt for virtual animals across a real terrain, shows how addictive such proxies can be, and how many people can enjoy hunting-like behavior despite being city dwellers completely isolated from natural environments.

Work of a field biologist is a particularly worthy alternative; even such a passionate hunter as Darwin eventually realized that, for he recalls in his autobiography: “I discovered, though unconsciously and insensibly, that the pleasure of observing and reasoning was a much higher one than that of skill and sport.” A “hunting instinct” might be a part of human nature, but so is the ability to enjoy following our instincts in intelligent ways.

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