

12. Ethology, Sociobiology, and Evolutionary Psychology

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So it came about, on a certain Whit Sunday, that, in company with my ducklings, I was wandering about, squatting and quacking, in a May-green meadow at the upper part of our garden. I was congratulating myself on the obedience and exactitude with which my ducklings came waddling after me, when I suddenly looked up and saw the garden fence framed by a row of deadly-white faces: a group of tourists was standing at the fence and staring horrified in my direction. Forgivable! For all they could see here was a big man with a beard dragging himself around the meadow, in figures of eight, glancing constantly over his shoulder and quacking – but the ducklings, the all-revealing and all-explaining ducklings were hidden in the tall spring grass from the view of the astonished crowd.

—Konrad Lorenz¹

If J. B. Watson had only once reared a young bird in isolation, he never would have asserted that all complicated behaviour patterns were conditioned.

—Konrad Lorenz²

Ethology

“I wonder what you would think if, on a beautiful June day, you suddenly heard from the gabled roof of a high house a wild rattling noise and, looking up, you saw Satan himself, equipped with horns, tail and claws, his tongue hanging out with the heat, climbing from chimney to chimney, surrounded by a swarm of black birds making ear-splitting rattling cries . . . When I had finished the ringing, I saw for the first time that a large crowd of people had collected in the village street, and were looking up with expressions [that were] aghast,” stated Konrad Lorenz, the Austrian naturalist, in his popular book *King Solomon’s Ring* (Lorenz, 1952/2002, pp. 41-42). This anecdote and the one above (opening quote) illustrate some of the more embarrassing moments he experienced in the course of studying animals as close to nature

as his home environment allowed. In the latter case the young black birds were jackdaws that Lorenz had reared in his attic aviary. He feared the birds would become shy of him if he placed identifying rings on them, so to thwart this he donned a costume, which happened to be one of the devil!

Critical Periods and Imprinted Learning

Involving himself with birds and other creatures of the wild clearly was not typical of psychologists or other scientists of this period. While still a young man Lorenz discovered that newly hatched graylag geese followed him about as though he was their mother. Goslings have also been known to follow not just their mother or a person but even moving figures as varied as electric toy trains and boats. But Lorenz found that mallard chicks would only follow him, one behind the other, when he squatted and squawked in close imitation of their biological mothers.

Once the chicks began following him, a “parenting” responsibility he accepted with boyish enthusiasm, but also with a kind of scientific rigor. The tendency of water fowl to follow a mother or maternal surrogate is called the *following response*. Although this response can be observed in different species the details vary, as when, for example, the mallard chicks were more particular in whom they accepted than were the goslings, hence their behavior was *species specific*. This attachment to the mother figure is also enduring and permanent. This form of learning thus seemed “pre-programmed” into each species. *Imprinting* is the term ethologists such as Lorenz used to describe this kind of learning; in other words, the ducklings and goslings were imprinted on Lorenz once they began their following responses.

Imprinting can only occur during a brief time, or critical period after birth, and it can only occur in the presence of a *releasing stimulus* (in this case Lorenz as the mother figure provided the releasing stimulus). If this stimulus does not appear during the critical period, it was thought, the response could not be learned at all; in other words, the learning is all or none. The imprinted or following response itself is a *fixed action pattern* which characterizes all of the members of the species without variation. A releasing stimulus is required to trigger the fixed action pattern.

Notice how this stimulus (Lorenz's movements) for goslings differed from other bird species.

For comparative psychology, imprinting is interesting because it raises the question of whether or not humans might also need to learn certain kinds of behavioral responses during critical periods of childhood. People tend to believe that humans are less dependent on instinct for their learning than other, presumably lower species in the evolutionary hierarchy. This question will be further examined in the chapter on attachment theory.

Ethology and Natural Selection

Niko Tinbergen defined *ethology* as the biological study of behavior (Burkhardt, 2005, p. 5). Ethologists typically (though not exclusively) study the behavior of different species in their native environs. Lorenz and Tinbergen shared the Nobel Prize in physiology or medicine, along with Karl von Frisch, for their original work in ethology. They were concerned as well on the ways in which species behaviors have been shaped by evolution. Ethology was thus strongly influenced by Charles Darwin whose theory of evolution stated that *natural selection* favored survival of the fittest members of each species in terms of their adaptability to their environments. Ethologists thought that experimental psychologists had "missed the boat" by studying animals in the laboratory where animals' behavioral repertoire was severely restricted. How could they then realize that different species evolved so as to adapt differing kinds of instinctual behavior patterns, in each case enabling them to insure their survival?

Charles Darwin's theory of evolution was based on a lifetime of his observing the natural world, but perhaps most significant was his voyage around the globe on the H.M.S. Beagle. The unique creatures Darwin found only on the Galapagos Islands provided him with convincing evidence that his theory was correct. Over millennia birds on different islands had evolved different beak sizes, to accord with the sizes of the seeds that were native to that environment. But he knew his conclusions would be controversial because they conflicted with biblical accounts of creation of an intact world. So unsurprisingly he waited for twenty years after initially formulating his theory to publish it, in the meantime

working the theory in more depth. He only did publish it when he learned that another researcher, Alfred Wallace, planned to publish a similar theory, so they co-published the first account. Then a year later Darwin finally published his famous *The Origin of the Species* (Darwin, 1859).

Further Examples of Species Specific Behaviors

Responses to releasing responses, though instinctual, don't always require a critical period to be effected. As further examples of species specific behavior, both Tinbergen and Lorenz studied the stickleback, a European species of fresh water fish, particularly with respect to aggression and mating behavior. These could be easily kept and bred in home aquariums. These fish are territorial, with each male establishing and protecting its own area for nesting and mating. The males would fight one another to defend their spaces. The male also builds the nest, and then entices the female to share his bubble nest by doing a zigzag "dance." The male also cares for the offspring (Lorenz, 1952/2002).

In fighting with one another, Lorenz noted that the male closest to his own nest always wins the ritualized battle, which, unlike, say, the Siamese fighting fish, does not end with the death of either combatant, as the loser eventually retreats. The closer to the nesting area the stronger was the response, and vice versa. Evolution thus provided two different species, the sticklebacks and the fighting fish, with differing instinctual behavior patterns designed to insure their survival.

Tinbergen (1958; cited in P. H. Miller, p. 286) noticed that his aquarium sticklebacks became exceedingly aroused at around a certain time each day. That was when a red mail truck passed by a window, because, he reasoned, this very big "fish" had coloration matching the aroused male fish's belly.

The characteristics of species specific behavior (Cairns, 1979) are:

1. It is stereotyped in form (has an unvaried sequence across individuals within the species).
2. It is instinctual.
3. It is universal (found in all members of the species).

4. Experience has relatively little to do with changing the behavior once it has been established.

However learning can also be a factor in acquiring species specific behaviors as infants become exposed to adult behavior. Examples include learning of bird songs that are unique to the species and territorial maps that guide migration.

Sociobiology and Evolutionary Psychology

“...any account of human psychological functioning that excludes evolution is ignoring an important piece of the puzzle about what it means to be human.”

—Bjorkland and Pellegrini²

Wilson and Sociobiology

Recalling John Locke’s empiricism from earlier, he presumed that at birth the mind is a “blank slate” and that all learning came from experience. But contra Locke and later, the behaviorists, the ethologists demonstrated that this was not the case, at least with many species of birds and animals. Lloyd Morgan’s famous canon warned that, in the interest of parsimony, animal behavior should be described in as simple terms as possible, and that it was unseemly to attribute human characteristics to lower species on the evolutionary scale. But what about generalizing behaviors associated with animals to humans? In high school science classes students may have learned that “ontogeny recapitulates phylogeny,” or in other words, the development of individual traits follows from the development of lower species. So for example, at an early stage the human embryo appears “lizard like.” Does this imply the possibility of inheritance of behavior propensities as well as to physical features?

In 1975 E. O. Wilson published “Sociobiology: the New Synthesis” where he claimed as much: that, in the tradition of Darwin and the ethologists, human behavioral propensities—including social behaviors—can be inherited. In Darwinian terms, behavioral repertoires evolved through natural selection: those that increased the chances of survival of both individuals and species

were retained. Both altruism and aggression, to cite just two cases, are exemplars. This view was so radical to some scientists that it created a great controversy (previously discussed in Chapter 3). In today's terms his work was not considered "politically correct." Partly in defense of Wilson and sociobiology Stephen Pinker wrote his best-selling "The Blank Slate: The Modern Denial of Human Nature" (Pinker, 2002). Pinker argued that, not just the concept of the mind as a blank slate, but also the Rousseauian idea of the "noble savage" (discussed in chapter 3) were faulty in their conceptualizations.

Wilson believed that evolution favored not merely the survival of the individual but, more importantly, also of the group or "tribe." To be more specific, sociobiology is concerned with the evolution of cultural behavior (Green & Piel, 2015). Sociobiology was strongly influenced by the work of Robert Trivers (e.g., Trivers, 1971) and William Hamilton (1964), and further advanced by Richard Dawkins (1976), all of whom influenced the evolutionary psychologists (Bjorklund & Pellegrini, 2002; Buss, 2019). Evolutionary psychology has clear roots in Darwinism and evolutionary biology, ethology, and sociobiology, and in the pioneering work of those researchers just cited.

Evolutionary Psychology

Evolutionary psychology (EP) is the study of the ways that evolution has shaped human behavior—including social behavior—and the brain and its mental processes. According to Leda Cosmides and John Tooby (1997), our brains evolved as "wet computers" that are pre-programmed into specialized, often *domain specific*, modules that help us to respond in ways that are appropriate to survival of the individual and the species. But the problems our brains were programmed to solve evolved from our early ancestors are not always the same kinds of problems we face today. In other words, not all of the "programs" are ideally as suited to modern life as they were for hunter gatherers. Furthermore, behaviors which are adaptive for one species may not be so for another: a dung beetle is attracted to feces whereas humans are repelled by the odor, because the beetle lays its eggs in the dung pile whereas for people that is a place where harmful

bacteria dwell. But unlike the computer, the human brain was not designed by an engineer; rather, it evolved through the process of natural selection.

As with the psychoanalyst, for evolutionary psychologists consciousness is like an iceberg. But their focus is not on repressed sexual desires. What is unconscious are behavior and mental processes which are automatic. We don't need to understand why we behave in certain ways in order for the behaviors to be adaptive; in fact, this would certainly require a lot of unnecessary circuitry, just as riding a bicycle doesn't demand that we "think" of which muscles we should move. A couple of examples among potentially thousands of modules are a newborn's innate ability to focus on faces and the taste we've developed for sweets. Sugars were needed by our ancestors but were in short supply in their times, so it is not surprising that we developed such a taste for sugars where they could be found. But this propensity for craving sweets has arguably become maladaptive in our own times as such cravings can lead to obesity and other health problems. Ditto for fats and salt!

**Robert (Bob) Trivers:
The Smartest Man You've Never Heard of?
(Or the Baddest in Psychology?)**

Robert Trivers, an acclaimed biologist, wrote several important papers on evolutionary psychology early in his career. One of the most original concerned *reciprocal altruism*; or the ways in which cooperation among species members serves to enhance the survival of others (Trivers, 1971). In a second work (Trivers, 1972) he considered mate selection, noting that females of the species tend to be choosy and focus more on quality in mate selection. For these and other works (discussed subsequently) he received the prestigious Crafoord Prize in 2007.

Trivers is a white man but he joined the Black Panthers and was close to its founder, Huey Newton, who became the godfather of one of his daughters (Bennett, 2005). "He was arrested for

assault after breaking up a domestic dispute. He faced machete wielding burglars who broke into his home and stabbed one in the neck. He was imprisoned for 10 days over a contested hotel charge. And two men once held guns to his head in a Caribbean club that doubled as a brothel” (Hutson, 2016, January, para. 2). Like a surprising number of geniuses, Trivers has bipolar disorder. He continues to work and write in his seventies.

Evolutionary psychology, though a young discipline, has generated a massive amount of research. Some aspects of it are more speculative than others and still subject to confirmation. It isn't possible to review all of this research here, just some of the most salient, in the sections that follow. The ensuing discussions rely heavily on David Buss's (2019) book, “Evolutionary Psychology, the New Science of the Mind.”

Mating Strategies

Although a lot of the EP research is relevant to marriage it must be noted that today fewer young people are interested in the formal commitment of wedlock, but the research on mating can apply as well to long-term committed relationships in which families still exist in a broad context: living together, sharing responsibilities in child rearing, and so forth. This caveat should be noted in evaluating the research on mating, as survival of the individual and passing on of one's genes to future generations may still be assured in such arrangements.

In most species, including humans, females select mates that they judge to be reliable providers. This also implies that fitness is a requirement for a successful mating. In most bird species the males are more colorful than the females, and the attraction to the birds' plumages as well as the way they exhibit in their strutting, play an important role in how they are “seen” in terms of their fitness. Although the female typically builds the nest in order to attract the male, this is not true of all species (vide the stickleback).

In humans men who are more physically attractive and perhaps athletic may be preferred, but more than that a man's social

position (status) and ability to earn plays a larger role. A man who is slightly older, who is seen as dependable, who has qualities of kindness, relates well to children, has common interests, and is emotionally stable, seems to be the best choice (Buss, 2019, p. 104, Table 4.1).

It should surprise no one that men tend to be attracted to younger women. From an evolutionary perspective this makes sense, because younger women are more fertile and thus more likely than their older peers to produce children and carry on the species. A woman's reproductive value declines with age. Not only physical beauty but also health are important variables for the male in mate selection. Facial symmetry, lack of scarring, small waist-to-hip ratio, full lips, and lustrous hair are a few of the feminine features that males find attractive that seem to be culturally universal (Buss, 2019). But having more body fat is considered desirable in some cultures where food shortage is common (Sugiyama, 2005). Clearly this factor is reversed in affluent Western cultures such as the United States where food resources are plentiful.

According to Buss, research shows that testosterone level in males plays an important role in mating strategy. The higher the level in a given male the more likely he is to pursue a sexual encounter with a female. From an evolutionary perspective, of course, the more such encounters the better the chances of reproducing one's genes. But on the other hand, a male with such qualities is unlikely to be a good steady provider. If he is a father he is also less likely to be involved with the upbringing of his children. Testosterone levels typically decrease following marriage with children. High T men may be less likely to be faithful in a marriage or committed relationship. There are clearly evolutionary tradeoffs in the value of having high versus low T levels.

Online dating sites serve as one of today's popular means for attracting dating partners. But is the motivation for people who use such services merely to have a good time, or for "hookups," or for long-term relationships? The answer is that it depends upon the person. Men often seek short-term sexual relationships because evolution favors men having many sexual partners, whereas women, as noted, are more likely interested in long-term

commitments. In our times women can feel safer about having a fling or two due to the advent of the birth control pill. Yet women on average still remain more cautious about who they will have sex with, and under what circumstances.

There are also sex differences in sexual fantasies with men having more variety of sexual activity and number of partners (often two or more) in their fantasies than do women (Buss, 1994).

Lastly, there is among males the problem of *parental uncertainty*. To put it bluntly, how does a man know that a child is really his, or if he has been cuckolded? Evolutionary psychologists find this uncertainty to be the basis of male jealousy, and also partly as a source for male aggression: “Given an equal sex ratio, for each man who monopolizes a woman, another man is forced to be a bachelor” (Daly & Wilson, 1996, cited in Buss, 2019, p. 147). Unmarried men who are also of lower economic status are more likely to commit murder of other men, as well as other acts of aggression or violence (Buss, 2019).

Familial Bonds

We care for our own. It seems quite natural that parents should bond with their children. From an evolutionary point of view this is only natural for the survival of the species. Although the mother-child bond is important, so too the father has a role in caring for the child, and this is true across cultures. Grandparents also have a role in supporting the family’s children, as do aunts and uncles. The closer the relationship to the child, the more care goes into their nurturance. And this makes sense. Although a parent may care for a neighbor’s child, her own offspring take precedence. Caring for and protecting your own close family members, after all, helps insure the propagation of our “selfish genes” (Dawkins, 1982) for future generations. “Theoretically, if everything else is equal, selection will favor adaptations for helping kin in proportion to their relatedness” (Buss, 2019, p. 218). This notion is the basis for Hamilton’s (1964) *inclusive fitness theory* of altruism, or why we should care for others and not just our own survival.

If our genes only “care” for us as long as we can live to reproduce, why, then, do women today continue to thrive following menopause? The “*grandmother hypothesis*” (Lancaster

& King, 1985) suggests that both grandparents live longer lives due to evolutionary forces because they can help to care for their grandchildren, thereby helping, less directly, perhaps, to insure the continuation of their genetic endowment.

But not every child in a family necessarily gets the same degree of nurturance. Parents tend to have “favorites,” even though they may try their best to be even handed. The favored children are, according to Daly and Wilson (1995), those who are the most “fit” in terms of their survival and reproductive potentials. Hence children in a family may become rivals for their parent’s attention. (cf., Freud’s sibling rivalry, Chapter 8).

Cooperation and Aggression

How do cooperation and aggression, two seemingly contradictory motives, both characterize humans as well as certain other species? The answer, of course, depends upon the circumstances. Humans and other primates, and to a certain extent some other species, are social animals; and living in a social milieu requires cooperation. Complex societies require large brains. Think of the importance here of the development of language for facilitation of social relations among humans. How could we survive as a society without language skills? How else could we have advanced science, literature, and mathematics? And bigger brains also require much longer periods of infancy in order to develop, which in turn necessitates more extended periods of parental care than, say, our nearest primate relatives, the chimpanzees.

Is Language a By-Product or an Adaptation?

Is language a mere by-product of our larger brains? This argument has been advanced by Noam Chomsky (1991) and Steven Jay Gould (1987). But Steven Pinker (e.g., Pinker, 1994; Pinker & Bloom, 1991) believes that language arose as a unique adaptation via natural selection. According to Buss (2019), Chomsky has “softened” on his stance, allowing for the possibility advanced by Pinker (Hauser, Chomsky, & Fitch, 2001).

But we are also tribal animals who are strongly bonded to our own groups; and tribes can be in conflict over food and territory with other tribes. Between-group competition can lead to extreme violence, such as warfare and even genocide.

But competition also arises among members of the same tribe (society). Who gets the biggest portion of the kill (or of closing a business deal)? To address such problems, rules and laws were formulated to help insure equitable sharing of resources. (Contrast the ways in which capitalism and Marxism conflict in their beliefs of how such matters of justice ought to be resolved. The first—in a democracy—pleads for the equality of *opportunity* [non-discrimination by race, gender, etc]. The second, for equality of *outcome* [“from each according to his abilities, to each according to his needs³”).

Humans and chimpanzees (or more specifically, the males) are the only species known to fight wars; chimps being our closest DNA relatives among primates. Men also overwhelmingly commit the majority of murders and the victims are also primarily other men; and this holds across all cultures (Daly & Wilson, 1988). Also, younger men are more prone to risk-taking and to violence: “Specifically, over the course of human evolutionary history, a young man seeking a wife had to display formidable physical prowess in hunting, tribal raids, tribal defense, and the ability to defend his interests. These displays were designed to impress not only women but also other men, to deter rival men from hindering the man in his quests” (Buss, 2019, p. 284).

As with Chimpanzees and baboons, our tribal hunting ancestors formed communities with hierarchies and rules. Cooperation among group members evolved to facilitate civility. Trivers (1971) extended Hamilton’s inclusive fitness theory to include not just family but also tribe. It only seems logical that survival of the species depends not only on survival of the individual and his or her family, but also survival of one’s community. But on the other hand, competition among tribes for territory and resources creates conflict, and conflict can lead to war. Humans evolved to be omnivorous, but a major part of the diets of our ancestors (before agriculture became a way of existence) consisted of meat; so the carnivorous aspects of our

being were at least at one point dominant. We evolved from “killer” apes; or in other words—like it or not—we are predators.

On one principal all social scientists agree: As with other primates, man is a social animal. This is not merely a result of his larger brain but rather a product of continuing evolution. However, our larger brains do enable us to form more complex social bonds than other species; or even of our now extinct hominid brothers and sisters. Man is not the only animal to utilize tools, or even to fashion them; but the tools he creates are far more complex than other species. And the ability to create fire and cook his foods, and to more easily digest his food, compensate for his lack of fangs and smaller jawbones. Man is, indeed, the “naked ape” (Morris, 1967).

Would it be more correct to say that man is a toolmaker, or that he is a weapon maker? Man’s earliest tools were indeed weapons, such as axe handles, spears, and arrow heads. And consider how many modern technological developments, at least in the US, came about through funding by our Department of Defense.

Mankind and War: Quotations Worth Pondering?

In his book *African Genesis*, Robert Ardrey, a playwright and science writer, cites the musical *Westside Story* as mirror on human nature:

“West Side Story is a supreme work of art for many reasons not the least of which is truthfulness. ... On a stage laid bare, and in young hearts laid naked, we watch our animal legacy unfold its awful power. There is the timeless struggle over territory as lunatic in the New York streets as it is logical in our animal heritage. There is the gang, our ancestral troop. There is the rigid system of dominance among males within the gang, indistinguishable from that among baboons. There is the ceaseless individual defense of status. There is the amity-enmity code of any animal society: mercy, devotion, and sacrifice for the social partner; suspicion, antagonism, and unending hostility for the territorial neighbor. And there is the hunting primate contribution, a dedication to the

switch-blade knife as unswerving as to the antelope bone” (Ardrey, 1961, p. 290).

And this from Ardrey’s *The Territorial Imperative*:

“In all the rich catalogue of human hypocrisy it is difficult to find anything to compare with ... the belief that people do not like war” (Ardrey, 1966, p. 260).

And finally, from Buss’s *Evolutionary Psychology*:

“...men appear to experience great excitement, glory, and sense of brotherhood at the prospect of war, a phenomenon that has frequently been reported by warriors...” (Buss, 2019, p. 295).

Most social scientists also agree that societies are organized in such a way that we balance amity (for members of our own group) with enmity (for “outsiders”). This also arises, according to evolutionary psychologists, from our tribal past, where competition for often scarce resources brought about competition between warring groups for territory.

Within a society, just as with the male sticklebacks and so many other species, fighting among males is primarily over territory (e.g., Ardrey, 1966; Lorenz, 1952/2002). Daly & Wilson (1985) identified a “young male syndrome” whereby young men act in risky and aggressive behaviors, as do many male mammals. This can serve to enhance a young man’s reputation as well as making him a formidable foe to other men within his peer group (Buss, 2019). Again, this is about territorial rights.

But cooperation among members within a social group also makes sense. Humans did not evolve to be helpful to one another in a vacuum, as other species—particularly primates—have also evolved to have altruistic tendencies. But Buss (2019) notes that “Reciprocal altruism can only evolve if organisms have a mechanism for detecting and avoiding cheaters” (p. 253). In their *social contract theory* Cosmides and Tooby (1989, 1992) state five

cognitive capacities required for successful cooperation among humans:

1. The ability to recognize different kinds of people (e.g., by their faces or the ways in which they walk or talk).

2. The ability to remember episodes of their interactions with specific others, or the history of those experiences.

3. The ability to make others understand your own values.

4. The ability to model the values of others. In order to do this one must be able to put oneself in another's shoes, so to speak.

5. The ability to represent costs and benefits, independent of the particular items exchanged. "It is our general ability to represent costs and benefits of exchanges, not a specific ability tied to particular items, that has evolved in humans" (Buss, 2019, p. 254).

In summary, Buss concludes that: "...psychological mechanisms for providing benefits to nonrelatives can evolve as long as those benefits are reciprocal in the future. The most important adaptive problem the reciprocal altruist faces, however, is the threat of cheaters—people who take benefits without reciprocating at a later time" (p. 271).

Sex and Gender

Another issue that arises in considering the ways in which evolution has shaped us concerns differences between the sexes. This can indeed be a touchy subject. In the author's opinion researchers differ, with some (to borrow some terminology from early perception theory) who might be called *sharpeners*—those who emphasize differences when they are found—and *levelers*—or those who tend to minimize gender differences. And here I believe that in general feminists tend to be levelers. Why? I believe this is because in the past, observing gender differences seems to have suggested that men are in some sense "superior"; for instance in spatial relations. According to evolutionary theory sexual specialization required men who were hunters to have a greater need for such abilities in order to find their ways while tracking game (e.g., Silverman & Eals, 1992)). On the other hand, women tend to be better in verbal skills (vide, the chapter on intelligence). Does it not make sense that the two sexes evolved to have separate,

specialized roles in their communities? Thus man became the hunter, who needed far-ranging game tracking abilities, and women, the child attenders, became the gatherers. (To put the gender difference controversy in perspective, gender differences *are* often indeed quite small or non-existent; [e.g., Spelke, 2005, on science and math] and the statistical differences say nothing about a given individual’s capabilities.)

The preceding discussion only scratches the surface of the complexities and implications of the newer, burgeoning field of evolutionary psychology. For greater depth the reader is referred to Buss (2016), Buss (2019), as well as the other references cited above. The reader can watch for new developments, some speculative, some more solid. For instance, as this is being written one study has come to the author’s attention, and that concerns a theory that cosmic bombardment from supernovae caused a large number of forest fires which may have forced early hominids from the trees to the savannah; hence evolution favored bipedal locomotion for these folk. According to Merlott & Thomas (2019), “Evidence for increased wildfires exists in an increase in soot and carbon deposits over the relevant period.”

Implications of Evolutionary Psychology for Human Development

What is the “nature” of human nature? This question was posed earlier in this text. But by now (if you’ve read the chapters in sequence) readers probably agree with the evidence that the concept of the mind as a blank slate at birth, and of the natural innocence of mankind, have been properly debunked. It can never be stated too often that who we are is a function of both nature and nurture, and part of the “nature” aspect is that we are social animals with “natural” tendencies to be both cooperative and aggressive, depending upon circumstances. Therefore Bjorklund and Pellegrini (2002) call for a *systems approach* to evolutionary developmental psychology: “Developmental psychologists have—

come to rephrase the nature-nurture issue, asking not “how much” of any characteristic is due to nature or nurture but rather “How do nature and nurture interact to produce a particular pattern of development? ... The developmental systems approach specifies how biological and environmental factors at multiple levels of organization transact to produce a particular pattern of ontogeny” (p. 335).

Development of Gender Roles

First, although all cultures have certain traditions regarding the differential roles of men and women, it is important to recognize that each is different. As an example, in many cultures women do most of the cooking and food preparation and wear facial makeup, yet men may do the barbequing. As another, in some cultures men paint their faces, dress in bright costumes, and do elaborate ceremonial dancing.

Gender roles are learned very early in life, as either they are taught outright or modeled by adults. But the fact that there are evolved gender role differences can be traced back to our ancient ancestors in which, as previously mentioned, men were hunters and women the gatherers. Some obvious examples are sex differences in aggression, mating strategies, and child care. As a consequence, in general boys enjoy rough-and-tumble play whereas girls seem to enjoy dolls and “playing house” (Bjorkland & Pellegrini, 2002). Boys, it seems, evolved such aggressive play from our ancestor hunters and fighter; girls because they were the primary caregivers to their children. Naturally, there are exceptions, and developmental psychologists today encourage parents to accommodate their child’s own natural proclivities, rather than force them into pre-conceived roles.

Length of Time for Maturity

Children take much longer to develop throughout childhood than do our primate cousins, or any other species for that matter. With our large brains there is much more that needs to be learned: “It was the confluence of a large brain, social complexity, and an extended juvenile period that set the stage for the modern human mind” (Bjorklund & Pellegrini, 2002, p. 337). So of course,

parenting has become almost an occupation in itself. When considering marriage and raising children adults should consider what an enormous investment in time and energy they must be prepared to take on.

Adaptations in Children not Designed for Adult Preparation

Play, including role imitation, serves an important function in preparing children for adult life. However, play may also have evolved as an essential mechanism for adjusting to childhood itself: “Play provides exercise and knowledge of one’s current environment and serves as a safe venue for establishing a social hierarchy and learning ‘one’s place’ in the cohort” (Bjorkland & Pellegrini, 2002, p. 339). Learning of social roles beyond gender is also facilitated in children’s play. In other words play aids in some ways to insure the survival and health of the child during development. As does infant facial imitation according to Bjorklund (1987); which, in this form, later disappears. But at this stage of ontogeny it can help cement mother-child bonding.

Cooperation and Aggression

That children learn to cooperate, as suggested by evolutionary theory, is not at all a new finding. Neither is the observation that boys are more aggressive in their play than are girls. But the natural implications for the tendency for nations to engage in warfare may seem more shocking. From this knowledge people may come to learn enough about our own nature to better adjust to a global (as opposed to tribal) world; and just perhaps learn to apply more cooperation on a global level.

The Self Redux

In the start of the section on the self—in the section on Jung—the nature of the self was discussed, highlighting especially the work of William James. Now with their work on evolution and the brain, Cosmides and Tooby tell us that our behaviors are largely determined by domain specific modules that evolved over the eons. If that is so, then what of the self?

The philosopher David Hume did not believe that people have “selves;” whenever he tried to observe something specific in his mind he found only fleeting, impermanent perceptions. This is in contrast to James, who observed his “stream of consciousness.” To reiterate, James described both self as an object (i.e., all that we identify with as “ours”) and self as a subject (i.e., the “experiencing” or “Knowing” self).

Antonio Damasio in his book “Self Comes to Mind: Constructing the Conscious Brain” (2010) was strongly influenced by James. First, Damasio is a monist (there is no mind or consciousness separate from the body). Second, he does take an evolutionary perspective to the problem of mind and self. He does not relegate consciousness entirely to the cerebral cortex, but stresses (and this may sound revolutionary) the role of the “humble” brain stem as well. Along with this, he believes that consciousness is not possible without feelings. His discussion of brain physiology and the experience of “qualia” cannot be simply summarized here, but he states that “There is indeed a self, but it is a process, not a thing and the process is present at all times when we are presumed to be conscious” (p. 8). But his main conclusion is that the brain evolved to create a conscious mind, and the self.

Mind, consciousness, self: Does Damasio’s account in any way invalidate Cosmides and Tooby’s views of their domain specific automatic patterns of responding? Not at all, but it does enrich them.

For Thought and Discussion

1. Have you ever kept small animals or fish you collected from nature in a home aquarium or terrarium? If so, share your experiences in observing them.
2. How does an evolutionary psychologist's view of the unconscious mind differ from the psychoanalysts?
3. Do you have any experience with online dating (that you are willing to discuss with others)?
4. What is your view of human nature? Do you really believe Ardrey, that people "like" war?
5. If you live in a mixed family, along with siblings who are only half related to you, what kinds of experiences would you consider sharing?
6. If you have children, can you relate how they cooperate or compete in your household?
7. If you've lived in a group facility such as a dorm, can you share your experiences of cooperation versus conflict?

Notes

1. Lorenz, K. (1952/2002, p. 42).
2. Lorenz, K. (1950, pp. 232-233; cited in Burkhardt, 2005, p. 312).
3. In formulating his theory of socialism, Marx bought into the Romantic Fallacy—he believed that our hunter gatherers lived in that sort of society. The situation with these ancestors, however, was much more complex.

References

- Ardrey, R. (1961). *African genesis: A personal investigation into the animal origins and nature of man*. New York: Atheneum.
- Ardrey, R. (1966). *The territorial imperative: A personal investigation into the animal origins and nature of man*. New York: Atheneum.
- Bennett, D. (2005, March 27) The Evolutionary Revolutionary. *The Boston Globe*. Downloaded May 2, 2019, from: http://archive.boston.com/news/globe/ideas/articles/2005/03/27/the_evolutionary_revolutionary?pg=full
- Bjorklund, D. F. (1987). The role of immaturity in human development. *Psychological Bulletin*, 22, 153–169/
- Bjorklund, D. F., & Pellegrini, A. D. *The origin of human nature: Evolutionary developmental psychology*. Washington, D. C.: American Psychological Association.
- Burkhardt, R. W., Jr. (2005). *Patterns of behavior: Konrad Lorenz, Niko Tinbergen, and the foundation of ethology*. Chicago: University of Chicago Press.
- Lorenz, K. (1952/2002). *King Solomon's ring*. London: Routledge.
- Buss, D. M. (1994). *The evolution of desire: Strategies of human mating*. New York: Basic Books.
- Buss, D. M. (2019). *Evolutionary psychology: The new science of mind*. (6th Ed.). New York: Routledge.
- Cairns, R. B. (1979). *Social development: The origin and plasticity of interchanges*. San Francisco: Freeman.
- Chomsky, N. (1991). Linguistics and cognitive science: Problems and mysteries. In A. Kasher (Ed.), *The Chomskyan turn*. (pp. 26-53). Oxford: Blackwell.
- Cosmides, L., & Tooby, J. (1989). Evolutionary psychology and the generation of culture. Part II. Case study: A computational theory of social exchange. *Ethology and Sociobiology*, 10, 51-97.
- Cosmides, L., & Tooby, J. (1992). Cognitive adaptations for social exchange. In J. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adaptive mind* (pp. 163-228). New York: Oxford University Press.

- Cosmides, L., & Tooby, J. (1997). *Evolutionary psychology: A primer*. [Online article]. University of Santa Barbara: Center for Evolutionary Psychology. Downloaded May, 2019, from: <https://www.cep.ucsb.edu/primer.html>
- Daly, M., & Wilson, M. (1988). *Homicide*. Hawthorne, NY: Aldine.
- Daly, M., & Wilson, M. (1995). Discriminative parental solicitude and the relevance of evolutionary models to the analysis of motivational systems. In M. S. Gazzaniga (Ed.), *The cognitive neurosciences* (pp. 1269-1286). Cambridge, MA: MIT Press.
- Daly, M., & Wilson, M. (1996). Evolutionary psychology and marital conflict: The relevance of stepchildren. In D. M. Buss & N. Malamuth (Eds.) *Sex, power, conflict: Evolutionary and feminist perspectives* (pp. 9-28). New York: Oxford University Press.
- Darwin, C. (1859). *The origin of the species*. New York: Modern Library.
- Damasio, A. (2010). *Self comes to mind: Constructing the conscious mind*. New York: Vintage.
- Dawkins, R. (1982). *The selfish gene*. New York: Oxford University Press.
- Gould, S. J. (1987). *The limits of adaptation: Is language a spandrel of the human brain?* Paper presented to the cognitive science seminar, Center for Cognitive Science, MIT, Cambridge, MA.
- Green, M., & Piel, J. A. (2015). *Theories of human development: A comparative approach*. (2nd Ed.). Boston: Allyn & Bacon.
- Hamilton, W. (1964). The genetical theory of social behavior. *Journal of Theoretical Biology*, 7, 1-52
- Hutson, M. (2016, January). Trivers' pursuit. *Psychology Today*, para 2. Downloaded from: <https://www.psychologytoday.com/us/articles/201601/trivers-pursuit>
- Lancaster, J. B, & King, B. J. (1985). An evolutionary perspective on menopause. In J. K. Brown & V. Kern (Eds.), *In her prime: A new view of middle-aged women* (pp. 13-20). Boston: Bergin & Carvey.
- Lorenz, K. (1950). The comparative method in studying innate

- behaviour patterns. *Symposium of the Society for Experimental Biology*, 4, 221-268.
- Melott, L., & Thomas, B. C. (2019, May). From cosmic explosions to terrestrial fires? (Abstract). To appear in *The Journal of Geology*. Downloaded from:
<https://www.journals.uchicago.edu/doi/10.1086/703418>.
- Miller, P. H. (2002). *Theories of developmental psychology*. (4th Ed.) New York: Worth.
- Morris, D. (1967). *The naked ape: A zoologist's study of the human animal*. London: Jonathon Cape.
- Pinker, S. (1994). *The language instinct*. New York: Morrow.
- Pinker, S. (2002). *The blank slate: The modern denial of human nature*. New York: Viking.
- Pinker, S., & Bloom, P. (1990). Natural language and natural selection. *Behavioral and Brain Science*, 13, 707-784.
- Hauser, M, D, Chomsky, N., & Fitch, T. (2002). The faculty of language: What is it? Who has it? And how did it evolve? *Science*, 298, 1569-1579.
- Pinker, S. (2002). *The blank slate: The modern denial of human nature*. New York: Penguin.
- Silverman, I. & Eals, M. (1992). Sex differences in spatial abilities: Evolutionary theory and data. In J. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adaptive mind* (pp. 533-549). New York: Oxford University Press.
- Spelke, E. (2005). Differences in Intrinsic Aptitude for Mathematics and Science. *American Psychologist*, 60, 950-958.
- Sugiyama, L. S. (2005). Physical attractiveness in adaptationist perspective. In D.M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 292-342). New York: Wiley.
- Tinbergen, N. (1958). *Curious naturalists*. New York: Basic Books.
- Trivers, R. L. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, 46, 35-57.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the decent of man*. New York: Aldine.
- Wilson, E. O. (1975). *Sociobiology: The new synthesis*.

Cambridge, MA: Harvard University Press.