Nikolaas Tinbergen (1907–1988)

Tinbergen was the co-recipient of the Nobel Prize in Physiology and Medicine (1973), along with Konrad Lorenz and Karl von Frisch, for their work in identifying the elicitation and organization of individual and social behavior patterns. Tinbergen was one of the founders of the science of ethology which studies the behavior of animals in their natural habitat. The emergence of this discipline brought considerable challenges to the assumption of the behaviorists that evolutionary adaptations could be ignored since, according to them, the laws of learning were the same for all species.

Tinbergen wrote a very influential book, *The Study of Instinct* (1951), in which he discussed the innate behaviors of different species, what are now referred to as species typical behaviors, and the environmental releasers (sign stimuli) that provoke instinctual behavior patterns—such as the mating dance of the three-spined stickleback. The three-spined stickleback male, for instance, during mating season attacks rival males. Tinbergen reports that a red spot on the belly of a rival elicits aggression from a territory-holding male. It is not the whole fish, as an integrated entity (i.e., possessing other colors, size, shape), that is being attacked; it is the color red. The male stickleback will aggress against anything having the color red, including, as Tinbergen reported, a passing mail van.

While I highly recommend this book to you, for our purposes, what I wanted to mention was his recognition of the role of culture in the behavior of humans, in particular with respect to aggression. In considering aggression in animals, Tinbergen argued that often aggression was due to issues of reproductive competition and territoriality. In such aggression there was also involved a concomitant aspect and that was fear (which will be explained shortly). According to Tinbergen, territorial species that have settled into and possess a territory will attack others that are intruders. The others, the intruders, may be in search of an inhabitable territory and have now come into possession of it. In non-human nature, when an intruder and a territory-holder confront each other, the advantage is with the possessor since the possessor may be more committed to holding the territory. Under such circumstances, the territory seeker is best off avoiding such conflicts by quitting the scene. Confrontation between territory-holding neighbors, on the other hand, is somewhat different since both have a commitment to their possession. Let us first consider conflicts between individuals and then return to group conflict.

Fear of harm is a powerful factor in the amelioration of all-out violence. In evolutionary terms unabated violence would not be conducive to a species' survival since either or both combatants could suffer serious harm. Over time such innate tendencies to avoid serious harm have evolved into signaling functions that are indicative of intent to aggress. By such devices all-out conflict can be warded off if not avoided altogether. Greeting gestures, such as chimpanzee and human hand-shaking, are examples of behaviors that ward off violence (Eibl-Eibesfeldt, 1970). At times such signals are ill-effective and aggression may not be forestalled. When they are ill-effective and one is engaged in outright hostility, other signal systems, *appeasement gestures*, have evolved to initiate cessation of ongoing hostility among different species. Rattlesnakes, for instance, will cease entangling and butting heads, which is how they aggress, and lie flat on the ground. Fence lizards, having realized their effort is headed toward loss, will first lower themselves face downward, and then scurry off. Wolves will display acceptance of defeat by either taking a begging stance or lying supine. According to Morris (1967), animals seek defeat and domination, not murder and destruction. Among humans and other primates, appeasement can involve screaming, crouching, prostrating, and groveling. Symbolically, humans seek to break off aggression by displaying a white flag or throwing a towel in. Such strife between individuals can be over territory, or for dominance within a group, or for a mate, but territorial disputes can also arise between groups.

The territorialism that takes place between groups, rather than individuals, adds another dimension to aggression (Tinbergen, 1968). The essential component with inter-group conflict is the way in which group members unite when under collective threat. Both unity and aggression are now of equal importance. When there is intrusion into a group's feeding territory group members unite to protect their holding. The response to border encounters between territory holders is somewhat different, however, from inter-individual conflict, in that both groups are in a state of conflict in motivation, and the scene is one of posturing and vocalizing rather than outright attack. There is a tendency therefore, on both sides, to either fight or flee, to attack or withdraw. While fight can ensue, outright annihilation of one group by the other is highly unlikely, although not unheard of.

No doubt our biological past reflects something of what modern chimpanzees display, and we do share most of our genes with them, but that tendency toward aggression and modern human warfare may be two different things. Two points must be borne in mind. First, we should recognize that warfare is not a reflexive response of human groups. Political negotiations intervene before outbreaks of warfare and settlements can even be concluded

that avert full-scale conflict. Certainly negotiation may only be cunning and subterfuge, a means of preparing for a blitz assault as Hitler demonstrated at the advent of World War Two.

The anthropologist Colin Turnbull (1962) reported on a territorial dispute involving an incursion of foreigners into the territory of the BaMbuti Pygmies of Africa. A group of foreign pygmies had crept in to steal the wonderful harvest of honey available within their tribal confines. It was decided that war was required to correct the matter. Turnbull was much distressed until he was told the following:

> Old Masisi's head is unsteady . . . It has worms in it. He will fight only with words. Every year those Pygmies come into our land and we go into theirs. There is plenty of food; so long as we do not meet there is no fighting. If we do meet, then those who are not in their own land run away and leave behind whatever they have stolen. That is the only way we ever fight—we are not villagers. (Turnbull, 1962, p. 275)

Who can tell what may erupt if food was insufficient? That is not the point, however. Human inter-group conflict need not eventuate in willful annihilation. On the other hand, there is no escaping the fact that humans engage in intraspecies destructiveness.

As Tinbergen (1968) cautioned, it is an error to generalize territorialism in animals to humans since humans should be studied in their own terms and contexts. To understand human warfare, he proposed, one must recognize how human groups unite when faced with outside danger. There is something beyond the fear and biological propensities to aggress that have arisen from outside threat in human territoriality and conflict. Warfare among humans, Tinbergen argued, is very much a cultural affair that reflects the fact that humans have undergone a unique evolutionary path, beyond the biological evolution of animals. Cultural evolution provides humans with a unique ability to pass experiences across generations interpersonally rather than through reproduction and some of what has been passed along has to do with warring practices. Before examining Tinbergen's position on this, however, we must take a diversion into a further development that is relevant to Tinbergen's argument but which he did not make note of.

A critical factor in the transition to modern humans was the transition from the hunter-gatherer tradition to agriculture. According to archaeologist and paleontologist Richard Leakey (1944–), the agricultural revolution, some ten thousand years ago, was a contributing

factor to the transformation in human life that promoted grand-scale warfare and annihilation (Leakey, 1981). In ancient times, when the territory of a group of hunter-gatherers was threatened, and violence was likely, it was possible for one of the groups to forfeit their claim and move on in search of a new encampment. The adoption of agriculture, however, meant first a commitment to a particular plot of land which had been proven more valuable and worth defending. Flight under these circumstances, would mean a loss of collective investment in labor (in ground preparation and irrigation, for instance) and an uncertainty with regard to future possibilities or impossibilities. There were accruing benefits to land retention that contributed to the appearance of large-scale aggression.

The retention and continued working of the land, according to Leakey, resulted in increased yields and increased yields meant larger populations could be supported. With more people than were needed for production, specialized forms of labor arose such as artisans and craftspeople, the emergence of villages, towns, and later cities, and a need for it all to be protected. Thus there arose a need for the soldier and the army. In that regard, Leakey pointed out, the archeological record only reveals evidence of warfare with the emergence of large towns but, as Leakey further pointed out, a lack of evidence does not guarantee a lack of such large-scale aggression (Leakey and Lewin, 1992). It does seem though that there is something more to human combat than a killer nature shared with other apes. The point is that the agricultural revolution (agri-"culture") may have raised humans from territorial skirmishes to full-blown warfare.

Now, returning to Tinbergen (1968), the division of labor that arose from the development of civilization produced craftsmen whose specialty was weaponry and weaponry was significant to the culture of warfare. Weaponry initially involved simply improving the chance of surviving direct, hand-to-hand contact with an opponent, increasing one's personal strength through the use of clubs for instance. Such direct contact gradually was removed as arrows and spears, and then catapults, rifles and cannons increased the distance at which one could exercise dominance over another. Three cultural factors came into play: (a) the brainwashing of warriors into believing that flight in conflict, a biologically adaptive response, was cowardice and despicable (and of course punishable by death); (b) the production of effective distance weapons; and (c) the elimination of appeasement gestures, due to lack of immediacy, which have disrupted the balance between aggression and fear.

Tinbergen accepted that humans are innately aggressive and territorial but it is culture, he believed, that is responsible for the beastly belligerence that is human warfare:

> Another cultural excess is our ability to make and use killing tools, especially long-range weapons. These make killing easy, not only because a spear or club inflicts, with the same effort, so much more damage than a fist, but also, and mainly, because the use of long-range weapons prevents the victim from reaching his attacker with his appeasement, reassurance, and distress signals. Very few aircrews who are willing, indeed eager, to drop their bombs "on target" would be willing to strangle, stab, or burn children (or, for that matter, adults) with their own hands; they would stop short of killing, in response to the appeasement and distress signals of their opponents. (Tinbergen, 1968, p. 1414)

Beyond this, one could point to societal conditions as agents of human destructiveness and hostile territoriality. Just consider how the competition for resources fueled European territorial conflict and expansion or how differences in political ideology, such as capitalism versus communism in the Vietnam War, have contributed to this type of conduct.

Leakey was clearly in agreement with Tinbergen's assessment:

> it is ludicrous to argue that organized warfare is equivalent to the baboon's aggressive baring of its canine teeth. National leaders who engineer military conflict with another nation are engaged not in aggression but in politics, and the individuals on the battlefields are more like sheep than wolves. Hand-to-hand killing is no doubt carried out in an atmosphere charged with emotion and anger, but think how much indoctrination and depersonalization has been performed in order to bring combatants to this state of mind. (Leakey, 1981, p. 242)

Human culture, it would seem, is a force that has the power to override our more innate inclinations, such as flight and escape, and surpasses them in directing behavior. To ignore the influence of culture, particularly as that comes to direct the lower-level, biological phenomena, would be a considerable omission.

References

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