



The motivation for biological aggression is an inherent and common aspect of the human behavioural repertoire

Lajos Rózsa

Animal Ecology Research Group, Hungarian Academy of Sciences – Hungarian Natural History Museum, Baross u. 13, H-1088 Budapest, Hungary

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SUMMARY

According to a widespread opinion shared by the vast majority of historians, instances of aggression using pathogen weapons constitute extremely rare events in human history. Similarly, students of human behaviour tend to believe that their science plays no role in explaining this phenomenon, which is held to be exceptional and abnormal. Contrary to this dominant view, I argue that Hamiltonian spite – like Hamiltonian altruism – is an inherent part of the human behavioural repertoire and it includes the use of pathogens for spiteful purposes. This paradigm is supported by the following observations. The use of pathogens as weapons emerged far before the scientific understanding of the nature of infections and epidemics, though it has been underrepresented in written history ever since. It is also present in our expectations concerning the likely behaviour of an enemy and it is also a frequent component of threats. Several languages appear to bear linguistic references to our motivation for biological aggression in profanity. Finally, given that wartime epidemics kill people at a rate comparable to (or exceeding) that of mechanical weapons, all wars fought in recorded history incorporated an element of aggression through biological means. On the basis of these arguments, I claim that the motivation for biological aggression is an inherent and common aspect of past and present human behaviour.

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Introduction

According to a widely accepted opinion, biological warfare is rare and atypical in human history, not even mentioned in most history textbook. Apparently, pathogen weapons have rarely been essential components of the human arsenals [1], and even their pure possession is illegal according to the international law [2]. Not surprisingly, US authorities and security experts worldwide were shocked unambiguously by the 2001 Anthrax letter attacks, that demonstrated how smoothly pathogens can be used to murder.

Here I set out to argue against a false and potentially misleading interpretation of written history. I aim to show that the motivation for using pathogens as weapons within the context of aggression is an inherent and common aspect of the human behavioural repertoire, present continuously throughout the history of our species, and also affects details of our everyday life.

Spite

Soon after the origin of his theory of kin selection, Hamilton [3] modified his views and proposed in a rarely cited paper that (i) altruism can be expected to occur between any two animals of a population that are more closely related, and (ii) spiteful behaviour can be expected to occur between any two individuals who are less

closely related to each other than might be expected by chance. Spite was defined as a form of behaviour that harms conspecifics without a direct adaptive benefit to the self. More specifically, spite is costly (has a negative effect) for the actor, but this cost is considerably smaller than the harm caused to the non-kin individual targeted. By directly harming those who are unlikely to carry copies of the actor's genetic alleles, the actor indirectly frees environmental resources, such as space, nutrients, and sexual partners for conspecifics, who are more likely to carry copies of the actor's genes.

In a strict Hamiltonian sense, humans are spiteful animals indeed. Spiteful activities harming genetically non-kindred rivals are widespread motives for military aggression, individual fights, rivalry in sports and business life, etc. [4].

Spiteful transmission of pathogens

A spiteful act can be carried out by different methods. Animals and even humans may sometimes injure or kill conspecifics, though this form of spite can be particularly costly for the actor due to the target individual's self-defence and potential counter-attack. Not surprisingly, forms of killing that exclude the possibility of self-defence are the most widespread. Specifically infanticide, as the safest way of killing conspecifics, appears to be widespread in several species of animals, such as birds or mammals [5]. More specifically, infants are primary targets during inter-group aggression in chimpanzees (*Pan troglodytes*), and apparently also frequent

E-mail address: lajos.rozsa@gmail.com

constituents of “additional losses of human life” during periods of war in our species [6].

Another risk-free mode of spiteful behaviour take place by means of infection; infected animals and humans can enhance the flow of pathogens from their own bodies toward particular conspecifics. For example, animals infected by gut-dwelling and water-transmitted pathogens may anonymously defecate into the drinking water shared by non-kindred rivals [7]. Earlier, I have shown computer simulation models [8] and used zoological examples [9] to claim that host-enhanced transmission of pathogens appears to be a widespread form of spite in Nature, although typically confused with, and thus mislabelled as, the parasites’ capability to manipulate host behaviour [10–12]. In fact, these two hypotheses are not mutually exclusive; pathogens may manipulate host behaviour in order to enhance transmission parallel with the host’s interest in transmitting them to particular conspecifics. In either case, host behavioural manipulation by parasites renders the spiteful transmission of pathogens notoriously difficult to detect and document. However, authors other than parasitologists, such as evolutionary biologist and theoretical ecologists agree that this latter phenomenon may well occur in social insects [13] and in higher vertebrates [14–17] as well.

This prompts the question whether biological aggression in humans, i.e. using germs as weapons, may partly be a biological phenomenon and can be interpreted within a Hamiltonian context.

Early bio-aggression

Biological warfare is archaic and may even be prehistoric. It was probably part of early tribal warfare, much earlier than the discovery of microbes or the understanding of epidemics (see e.g. [18]). Anecdotal evidence indicates that tribal warriors of North America and medieval soldiers in Europe both used carcasses and faeces to contaminate the enemy’s drinking water or just as objects to throw on the enemy, e.g. by means of catapults [19].

Underrepresented in written history

During a time of war, the military faces a double task. First, it has to defeat the enemy partially by means of killing, and second, it has to ensure that the public both at home and abroad will interpret this act as a fair and heroic deed. Biowarfare may be effective to achieve the first goal, but it is detrimental to achievement of the second. The prevalent opposition to the use of germs as weapons is so strong that even the Biological and Toxin Weapons Convention [2] referred to it as the argument for the global ban of biological weapons:

“...the possibility of bacteriological (biological) agents (...) being used as weapons (...) would be repugnant to the conscience of mankind.”

It is therefore reasonable to presume that, provided that the military uses biological weapons, it will do its best to mislead the public and pretend that all victories were achieved by means of traditional weapons. Moreover, aggression through biological means is easy to hide, particularly during a time of war, since war is usually accompanied by devastating epidemics. Thus the direct application of pathogen weapons may happen to be underrepresented in historical documentations.

Expectations concerning the enemy use of bioweapons

During periods of pre-war political tension and particularly during times of war people typically expect the enemy to launch attacks using biological weapons, see [20] for a recent review.

Threats

People often threaten their enemies with the launch of an attack using pathogen weapons. When given the technical information that such a threat looks like white powder, thousands of people immediately sent “white powder letters” mimicking Anthrax attacks. Within the year after the 2001 Anthrax letter attacks, about 15,000 Anthrax hoax letters were sent by anonymous persons in the US and much more globally – at least if considering only the officially investigated cases [21]. It is safe to presume that most white powder hoax letters were simply thrown into the dustbin, thus one can estimate the true number of such threats to be higher by one or more magnitudes. Some experts believe that hoaxers are pathological individuals who tend to be “the cranks and losers in life”, who “aren’t normal, whatever that means” or “sociopaths, antisocial sorts, who get their particular deviant needs” etc. However, other experts also note that they “appear as normal, middle-class, adults (...) with workaday jobs and typical family lives” and they “tend to be men because it is essentially a power thing” [22]. We can only conclude that threats of using pathogen weapons are anything but rare.

Linguistic references to biological weapons

Hungarian and Polish, and no doubt several other languages, bear linguistic references to inherent human motivations for attacks using biological means. Profanity – so-called “bad language” – contains references to infections. These epidemiological curses expressed the wish that the person targeted be struck by malaria, syphilis, an ulcer, etc. It seems likely that at the origin of such phrases, people did believe that their curses were effective in making the target person acquire the disease. Thus “epidemiological profanity” may actually constitute acts of biological aggression, even if evidently ineffective according to modern science.

All wars involve biological attacks to some extent

War is always accompanied by epidemics. At least up until the time of the Vietnam War, pathogens caused more wartime fatalities than weapons did [23]. Military decision-makers knew this well, and they launched wars in order to kill the enemy by means of pathogens and weapons. Essentially this means that all wars fought in human history before the Vietnam War were biological wars, at least to a certain – often very large – degree. Naturally, since the public is less willing to accept pathogen warfare in comparison with more fashionable forms of killing, such as the use of the air force, political and military professionals routinely underestimate the epidemiological causes of death tolls and notoriously overestimate the fatalities caused by allegedly more noble weapons.

To summarize

There is currently widespread opinion shared by the vast majority of historians according to which instances of aggression through the use of pathogen weapons are rare and aberrant events in human history. Similarly, students of human behaviour tend to believe that their science has little role in explaining this allegedly abnormal phenomenon. Contrary to this dominant view, I argue that Hamiltonian spite – just like Hamiltonian altruism – is an inherent part of the human behavioural spectrum, and this includes the use of pathogens for spiteful purposes. Aggression using biological means emerged far before the scientific understanding of the nature of infections and epidemics, though it has been underrepresented in written history ever since. It is present in our expectations concerning the likely behaviour of the enemy

and it is also a frequent component of threatening human behaviour. Several languages appear to bear linguistic references to our motivation for biological attacks in profanity. Finally, given that wartime epidemics kill people in a rate comparable to, and often exceeding that, of classical weapons, all wars fought in human history incorporated an element of biological aggression. On the basis of these arguments, I suggest that the motivation for acts of aggression through biological means is an inherent and common aspect of the human behavioural spectrum.

Naturally, most human beings living in modern hygienic societies cannot practically know how to carry out an attack using pathogens. However, their motivations to do so are evidently present in many aspects of wartime history and in our everyday life as well. This means that it is not at all an unusual phenomenon for peoples and societies to be concerned about the threats posed by potential bioaggressors after the 2001 Anthrax letter attacks. Contrarily, it was unusual to have neglected this threat before 2001. Perhaps it was the amazing speed of technological advance in the weapons industries experienced through recent centuries that simply misled peoples about the very nature of weapons, aggression and warfare.

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