

Fascination violence: on mind and brain of man hunters

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Abstract Why are savagery and violence so omnipresent among humans? We suggest that hunting behaviour is fascinating and attractive, a desire that makes temporary deprivation from physical needs, pain, sweat, blood and, ultimately, the willingness to kill tolerable and even appetitive. Evolutionary development into the “perversion” of the urge to hunt humans, that is to say the transfer of this hunt to members of one’s own species, has been nurtured by the resultant advantage of personal and social power and dominance. While a breakdown of the inhibition towards intra-specific killing would endanger any animal species, controlled inhibition was enabled in humans in that higher regulatory systems, such as frontal lobe-based executive functions, prevent the involuntary derailment of hunting behaviour. If this control—such as in child soldiers for example—is not learnt, then brutality towards humans remains fascinating and appealing. Blood must flow in order to kill. It is hence an appetitive cue as is the struggling of the victim. Hunting for men, more rarely for women, is fascinating and emotionally arousing with the parallel release of testosterone, serotonin and endorphins, which can produce feelings of euphoria and alleviate pain.

Bonding and social rites (e.g. initiation) set up the constraints for both hunting and violent disputes. Children learn which conditions legitimate aggressive behaviour and which not. Big game hunting as well as attack of other communities is more successful in groups—men also perceive it as more pleasurable. This may explain the fascination with gladiatorial combat, violent computer games but as well ritualized forms like football.

Keywords Aggression · Violence · Child soldiers · Trauma · PTSD

“Far away, I am hearing screaming and gunfire and my head is growing smaller and my body is growing bigger. I am wanting to kill; I don’t know why. I am just wanting to kill...”

Uzodinma Iweala “Beasts of no Nation”, p. 58

Theoretical background

Why is cruelty and violence that omnipresent in men? The considerations and hypotheses presented here are based on our research in war and crisis regions throughout the world, on initial neurophysiological studies in the laboratory and also on findings of social and evolutionary biology and psychology. Our model includes the following:

- (1) The hunting behaviour in male hominids—who evolved from vegetarian ancestors—has developed since the Pliocene [1], i.e. since several million years. Being rewarded with social and eventually reproductive success led to hunting for ever bigger trophies. In

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the course of evolutionary adaptation, reward systems became reorganised to experience hunting behaviour positively. Deprivation from bodily needs, pain, blood, sweat and eventually the willingness to kill must have become clues for appetitive arousal. In men, these clues may act as primary rewards. Forms of hunting behaviour, including acting it out in computer games or hunting-associated forms of athletic competition, will be perceived as emotionally arousing, exciting and appetitive.

- (2) The evolutionary development with regard to the “perversion” of the hunting urge, i.e. its assignment to conspecifics, was and is nurtured on the one hand by the advantage of personal and social power and on the other hand by the specifics of the neurobiology of the hunting behaviour in man.
- (3) In the course of the ontogenesis, the sensation towards and the control of atrocious behaviour will be formed. Unfavourable environments like those of child soldiers foster the development of personalities, which appear cruel “by nature”. Child soldiers themselves have termed these as “*cruel people*”,

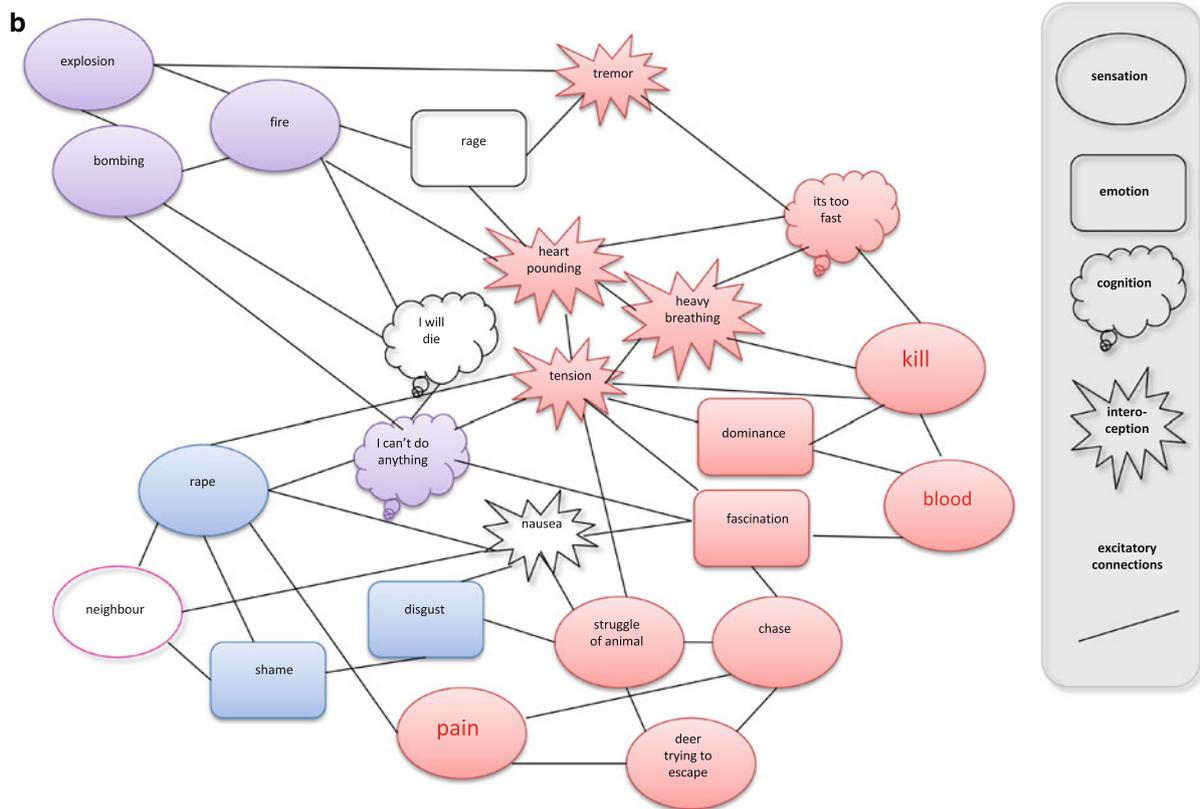
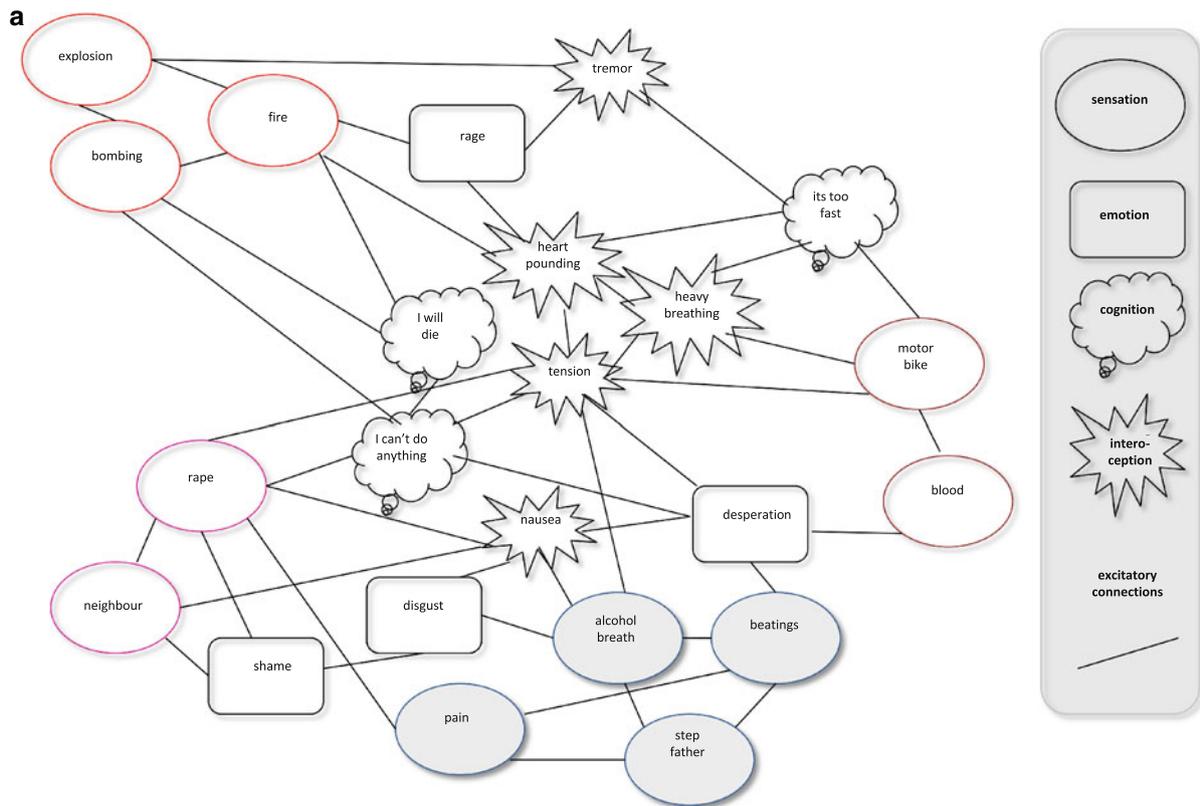
Ethologists assumed for a long time that the deletion of the intra-specific inhibition towards killing in animals would have led to endangerment of the whole species [2] and thus was held in check by a cost-benefit calculation of the own genetic fitness [3]. However, research during the last decades revealed that the fight “man against man” has been the prevalent cause of death for species closely related to man [4–6] suggesting hominide-specifics in the brain architecture underlying hunting behaviour. Controlled inhibition of intra-specific instrumental violence and aggression became possible because higher systems, especially the elaborate architecture of the frontal lobe in humans [7], were able to prevent unwanted blunder in hunting behaviour. More specifically, we presume that—like for other forms of emotion regulation—interactions with the frontal cortex regulate limbic functions, especially those of the amygdala, and modulate the plasticity of the hippocampus [8]. However, if control through the frontal centres is diminished or blocked, atrocities vis-à-vis fellow men will be perceived as fascinating and even attractive. Consequently, it may be predicted that aggressors show a diminution of the cortically regulated inhibition of the neural circuits for aggressive behaviour (such as the amygdala and the hypothalamic attack area). They may even use the power of frontal lobe-based planning for attack. When ex-combatants return to their civil homes, they may restore inhibition and control the desire for aggression and the lust to kill—but there are as yet no insights into how good or for how long this will work in any given individual. The potential to switch back to the

“aggressor mode” might explain why it is extremely difficult to pacify crisis regions or restrict the risk of violent recidivism in former offenders. As a matter of fact, during our expeditions in northern Uganda and in the eastern part of the Democratic Republic of Congo, we frequently had come to realise that former child soldiers form small groups of outlaws in civil life, performing violent and criminal acts to a varying degree. This corresponds well with the findings in Angola suggesting a high percentage of former adolescent combatants commit offences or become bandits [9].

We thus suggest that in analogy to the *fear network* [8, 10], a *hunting network* is formed which competes with the former one with regard to a sequence of sensory and physiological components (Fig. 1): The massive exposure to violence leads to an extension of a fear network that can be triggered by the re-exposure to one of the violence cues and will then evoke a massive alarm response. In contrast, exposure to the same violence cues from the perpetrator’s perspective would form connections that are integrated with the appetitive elements of the hunting behaviour. This “*hunting network*” rather elicits an appetitive arousal when ignited, i.e., when a sufficient number of its memory elements has been activated by respective exteroceptive and interoceptive stimuli. However, as violence cues share many sensations, cognitions and physiological responses with those that may also form part of the fear network, even in frequently hunting perpetrators the exposure to violence can cause severe distress if the integration into the hunting network fails and memories are integrated into the fear network (see Fig. 1).

Growing up with violence: networks of fear and hunting in former child soldiers

In March 2008, the authors investigated the mental health of former child soldiers in northern Uganda and received statements showing how the children describe the changes: “...*cruel people are warriors;... always follow orders; ... have a contaminated mind; ... say everyday I will kill you*” and so on. Apparently, “*cruel people*” are boys and men who became used or even “addicted” to killing. Usually, they take up a higher rank in the group of rebels who are fascinated by them. Their atrocities are emotionally thrilling, even full of relish. Former child soldiers estimate the percentage of “*cruel people*” at up to 50% of all combatants in these rebel groups. The children themselves present somewhat astonishing insights on how this cruelty is developed which are presented here in abbreviated form: “*Cruelty will turn you cruel... They take revenge for things that happened to them and become cruel... Children are made to punish each other... The process takes about*



◀ **Fig. 1** Competition between the fear network (*left*) and the hunting network (*right*). **a** Fear network: repeated experience of traumatic stress forms a fear network (*left*) that can become—as Schauer and Elbert [10] put it—pathologically detached from contextual cues such as time and location of the danger, a condition, which, if sufficiently strong, manifests itself as PTSD [8, 10, 11]. **b** Hunting experiences also form a network (*right*) of related sensory, cognitive and physiological memories, which may be very similar to the contents of the fear network. However, the affective valence of much of the emotional experiences and memories is exactly opposite: the fear network links the memories of the event only to negative affect, while the valence of the disposition to hunt is intrinsically positive

2–3 months... Boys from 8 years on can be turned into terrible killers... The age from 8–17 is the window of opportunity...

Our findings suggest that “*cruel people*” have a higher chance of survival in the bush. This could be due to the fact that the appetitive, fascinating element of violence (the “lust for hunting”) prevents the incorporation of the cruel, genuinely traumatising experiences into the fear network (Fig. 1). This can also explain our initially surprising findings that many of these children and adolescents do not fall ill within the trauma spectrum (PTSD, depression, addiction) although they went through tremendously distressing experiences and ongoing threats of torture and death.

As exposure to different types of traumatic stressors increases, the prevalence of PTSD and other manifestations of a mental illness increases. We have observed this “building-block-effect” of cumulative trauma throughout many crisis regions [12–14]. However, in male combatants, exposure to and exertion of violence may not necessarily increase the likelihood for PTSD. While we do find a correlation between the symptom scores (measured by structured interviews such as the CAPS) and the number of types of traumatic experiences child soldiers have experienced during their civil life, we do not find this frequently observed building-block-effect for their lives as rebels. In Pfeiffer & Elbert (submitted), we likewise fail to observe the positive correlation between trauma symptoms and cumulative exposure to traumatic stress, and the latter measured as retention period within the rebel group.

This is surprising, given the fact that life-threatening situations will create a fear network that assembles all highly arousing emotional-sensory and somatic memories of the horror experience, while simultaneously losing the contextual information (Fig. 1a): the “when and where” of each experience is not integrated in the network, its elements are no more perceived as memories from a different time and place, the horror becomes present [8, 10, 11]. A variety of symptoms from the spectrum of post-traumatic symptoms develops. Thus, one of the main consequences of untreated traumatic experiences is that the

emotional-sensory (“hot”) past continuously pushes into the present. The memories remain largely implicit, making it impossible for the traumatised to talk about them, a phenomenon, that has been called “speechless terror”. In reports about the “*cruel people*”, former child soldiers describe precisely the contrary to “speechless terror”: “...*after they have killed someone, they sit together and talk about their killing stories like an adventure and re-enact the victim’s suffering with scoff and laughter...*”

Two different origins of violent behaviour: reactive and appetitive aggression

Two different forms of aggression can be identified, a reactive–impulsive one and an appetitive, controlled-instrumental form. These two forms of aggression differ behaviourally and also with regard to neurobiology and neuroendocrinology: (1) The reactive–impulsive form is known to women and men alike; if an acute threat is posed, either versus oneself or one’s children or members of the group or also versus one’s own resources (e.g. one’s home), the disposition to harm others increases spontaneously and desultory. (2) But the controlled-instrumental (appetitive) aggression is planned, target-oriented and—that is what we presume—motivated out of itself from hunt and power: it is the aggression of the considerate aggressor, the hunter, the one in power and it is the form of aggression hitherto seldom scientifically examined. Reactive aggression is more impulsive and in humans, it is usually associated with anger, whereas instrumental aggression is purposeful, goal-oriented and in male hominids fascinating and appetitive. Higher profile confrontations (mass killings, genocides or assassinations) may be rooted in the more appetitive forms of aggression. The understanding of these dynamics is therefore essential for social and political scientists as well as for forensic psychology and psychiatry.

We presume that neurotransmitters and neuromodulators, such as serotonin, endorphins, testosterone and cortisol signal euphoric emotions, reduce depressive behaviour and alleviate pain. Bonding and social rites such as initiation activate the same neuronal circuits and may therefore prepare for the hunt as well as for violent fights. Big game hunt is not only more successful in groups, men do also perceive it as more full of relish. They hence are intrigued by gladiator fights and more civilised games such as soccer.

Blood must be shed in order to kill. Atrocities like the cutting off of ears, lips or genitals—as continuously practised by rebel groups all over the world—might be explained on this background. Hence, we observe these seemingly bizarre acts of cruelty like the cutting off of prominent parts of the body (ears, nose, genitals, fingers and so on) in completely different crisis regions and

scenarios with varying cultural and historical background. Following the mentioned evolutionary considerations, a hunter, deprived of modern weapons, must crave for shedding its prey's blood. Apparently, such reactions are found in predators as well as in human hunters, albeit due to an analogue (different genetic blueprint) rather than homologue development.

We have developed an adequate instrument that may record this specific form of appetitive aggression (available from the authors) and we have used it in studies in the crisis regions in order to illuminate the correlation between traumatic stress, appetitive aggressive potential and mental illnesses. We defined appetitive violence experience as the perpetration of violence or the infliction of harm to a victim that is aimed to experience violence-related enjoyment by the exposure to violence cues such as the struggling of the victim. In Uganda, we examined the relationship between appetitive perception of violence and trauma-related symptoms in a sample of former child soldiers (from the LRA) and a non-abducted control group. Appetitive violence experience was present at least to some degree in both, abducted and non-abducted youths, except that the extent was more substantial in the formerly abducted group. We identified appetitive violence experience to be the best and only significant predictor for the number of personally committed crimes in both groups. This relationship is well explained by assumptions of a cycle of violence: abused children are at risk to become murderers and perpetrators of violent acts [8, 15]. Moreover, the results (Fig. 2) indicate “that violence breeds violence” not

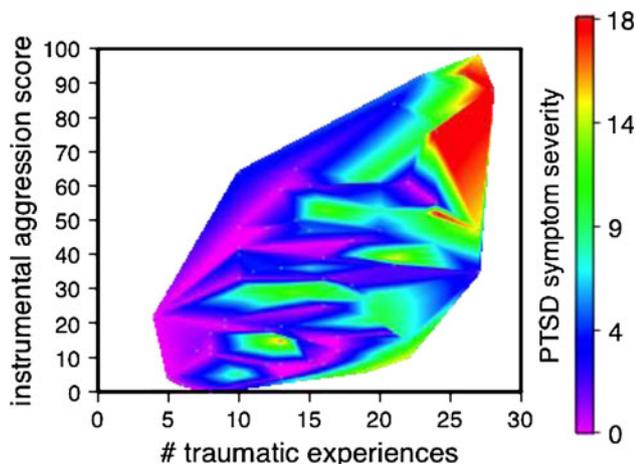


Fig. 2 With increasing number of traumatic stressors (abscissa) instrumental aggression increases as well (ordinate). The colour coding of this *contour plot* indicates that the severity of PTSD symptoms increases also with cumulative exposure to traumatic stressors, but it does not increase with the instrumental aggression score. Actually, for intermediate levels of exposure to traumatic stressors (experienced and witnessed 10–20 different types of traumatic stressors), the severity of PTSD symptoms remains small in those with high aggression scores (data from [16])

simply in form of reactive aggressive acts, but fosters appetitive, instrumental violence, which in turn increases the likelihood for intentional violent offenses. PTSD-related symptoms were reduced or even absent in those who reported violent acts as more positive. With increasing exposure to traumatic stressors, both trauma-related symptoms and instrumental aggression increase. At intermediate levels of exposure, however, symptoms of mental illness remain limited in those who report that violent acts have become attractive and fascinating (Fig. 2).

However, there is no ultimate resilience, and the protection wanes as the exposure to traumatic stressors exceeds a certain threshold. Testing 269 Rwandan prisoners accused or convicted for crimes related to the 1994 genocide, we again found empirical support that the victim's struggling can be an essential reward for perpetrators. Moreover, those who reported a greater attraction and thrill to exerting instrumental aggression again presented with fewer trauma-related symptoms and a smaller likelihood for PTSD [16].

The reason, why appetitive aggression, including planning, perception and experience of violent acts may promote resilience for PTSD can be explained on the basis of the competition between the networks representing the generalised fear and hunting experiences (Fig. 1).

Brain structures involved in regulating appetitive aggression

Aggression and social stress are linked as both mobilise activity in specifically related brain regions and both interact in potentially vicious cycles. For instance, chronic stress applied during puberty accelerates the progression of development of aggressive behaviours, accompanied by neuroendocrine changes in brain regions like the amygdala and bed nucleus of the stria terminalis that are active in both stress and aggression. Social stressors can stimulate a significant increase in synaptic activity in this neural circuitry provoking the disposition for intense aggression. As already mentioned, the primary regulatory control of aggression is inhibitory, and aggressive tendencies are held in check by partially learnt forms of emotion regulation. Notably, serotonin responds rapidly to stressors and appears to play the most important role for this inhibitory regulation. In addition, the adrenocortical steroid hormones can be inhibitory to aggression, depending on timing in relation to the stressor. Disinhibition of aggression leads to impaired recognition of social cues and enhanced impulsivity. The prefrontal cortex [17], the mesial temporal lobe [18] as well as the orbitofrontal regions [19] are involved in the regulation of aggressive and violent behaviour, presumably mainly through regulation of the cross-linking

within the amygdala. Dysfunctions in these structures lead definitely to deficits in moral socialisation [20, 21]. Unfortunately, previous studies focused solely on the reactive–impulsive form of aggression and left the controlled-instrumental aggression aside.

Outlook

Accordingly, we postulate that the inhibitory mechanisms, primarily those arising in frontal lobe structures, should be used to control the fascination to kill and the lust for aggression in child soldiers after their return into civil societies. Disinhibition, however, seems easily possible; the former child soldiers can thus be re-recruited by the army or the rebels. The reasons for the former “*cruel people*” to join the forces again do not necessarily have to be of pecuniary kind, the “lust for hunt, men-hunt” would suffice to establish new terror commands in regions like southern Sudan, northern Uganda, eastern Congo, Somalia or Afghanistan. As long as these considerations are not taken into account, lasting peace and law-and-order seem to be impossible to establish in these regions. As of yet, we have little means to prevent the creation of war societies and help repair failed states that house these irregular forces.

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Conflict of interest The authors declare that they have no conflict of interest.

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