Tribal war drove human evolution of aggression

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Wars are costly in terms of lives and resources – so why have we fought them throughout human history? In modern times, states may fight wars for a number of complex reasons. But in the past, most tribal wars were fought for the most basic resources: goods, territory, and women.

These reproduction-enhancing resources prompted our ancestors to fight in order to pass down their family genes. With war as a driving force for survival, an interesting pattern occurred, according to a new study. People with certain warrior-like traits were more likely to engage in and win wars, and then passed their warrior genes down to their children, which – on an evolutionary timescale – made their tribe even more warrior-like. In short, humans seem to have become more aggressive over time due to war's essential benefits.

In their study, Stanford University scientists Laurent Lehmann and Marcus Feldman have presented a model showing that aggressive traits in males may have evolved as an adaptation to limited reproductive resources. Because tribal war serves as a method for appropriating territory and women, war may have driven the evolution of these traits.

The scientists use the term "belligerence" to refer to a trait that increases the probability that the person's tribe will attack another tribe. Likewise, "bravery" refers to a trait that increases the probability that the person's tribe will win a war, whether they have attacked or are being attacked.

Lehmann and Feldman demonstrate in their model that belligerence and

bravery continue to genetically evolve through the male line. When one tribe conquers another, males in the conquering group mate with females in the conquered group, and pass the warrior traits to their male offspring.

“Suppose that for some reason or another each individual in a population is committed through genetic or cultural influence to go to war with probability 0.5,” Lehmann told *PhysOrg.com*. “Now in one group, an individual appears that is willing to go to war with probability 0.6, which, statistically, will increase his group to go to war. The genes or cultural variants causing individuals to go to war with probability 0.6 may then invade the population (because their bearer and their group members will produce more offspring and send more genetic or cultural variants in the next generation than individuals expressing the probability 0.5 to go war, and on average they will transmit to their offspring the tendency 0.6 to go to war), but this will take several generations, especially if belligerence or bravery is genetically determined.

“Once the probability 0.6 is fixed in the population, a value of 0.7 is more likely to invade than a decrease to 0.5. So it is true that there is gradual, step-by-step evolutionary process causing the increment in the tendency to go to war, but this might take a long time. Our model is a bit less idealized than this, but it works approximately like that.”

However, as you might expect, there is a downside to belligerence and bravery. While both these traits offer advantages during war for a tribe, both traits are also considered high-risk social behaviors. An individual possessing the traits has a greater chance of dying, which means the tribe not only loses a warrior, but the death also opens a spot for another male to appropriate the first male’s reproduction-enhancing resources.

This trade-off leads to another question: if an individual himself does not benefit from belligerence and bravery, but only his tribe, why would

humans evolve this altruistic trait? The scientists explain that the answer is kinship: a human will take the risk of dying for close relatives since they carry very similar genetic material, and will pass that genetic material on for him.

“The mathematical analysis in fact shows that the selective pressure on belligerence and bravery is substantially driven by the benefits of conquest that accrue on the relatives of the belligerent and/or brave males within their group, showing that kinship ties shape warfare in our model,” Lehmann said. “Evolutionary biologists refers to this as ‘indirect’ transmission of genes because the individual expressing the trait does not reproduce (it's in fact costly for him), but other individuals from the group who survive may indirectly benefit from the behavior of the possibly dead brave male.”

Lehmann added that the genetic relatedness concept stems from the late Bill Hamilton of Oxford University, one of the greatest evolutionary biologists of the 20th century. Prior to Hamilton, the British geneticist J. B. S Haldane also hit upon the idea in a famous anecdote. When asked by a friend at a pub whether he would risk his life to save a drowning man, Haldane scribbled some notes on a napkin and answered, “No, but I would do it for two brothers or eight cousins."

The same idea holds true for the altruistic traits of belligerence and bravery, but Lehmann and Feldman were surprised to find just how large a group could show the kinship connection.

“[The greatest significance of this study is] showing that the selective pressure on belligerence and bravery may remain substantial even in groups of large size (approximately 50 males and 50 females),” Lehmann said. “This is interesting because it is usually assumed that individually costly, altruistic traits (of which belligerence and bravery are only particular examples) would only be able to evolve in very small-

sized groups, like the nuclear family or something only slightly bigger. The demographics behind warfare may explain the evolution of altruism in larger groups than have usually been assumed in more standard biological scenarios aimed at understanding the evolution of altruism."

Among other interesting results of the model is the finding that bravery is even more highly desired than belligerence, since bravery has advantages when tribes are on both the offensive and defensive sides. On a different note, even though the model describes genetic inheritance, the scientists say that these traits could also be inherited culturally (through nurture rather than nature).

Today's modern wars between large states, as opposed to tribal wars, don't follow the same model. Rather, one of the most common explanations is that modern wars are fought when the benefits outweigh the costs, in a fairly rational way. But do the results of this study, showing that we are all offspring of conquerors, suggest an underlying primitive explanation for why we fight "rational" modern wars? Though it may be an intriguing idea, Lehmann doesn't think so.

"I don't think that our study helps in one way or another to understand war between states, but there are many interesting and relevant theories for understanding such wars that have been developed by economists and political scientists," he said.

More information: Lehmann, Laurent and Feldman, Marcus W. "War and the evolution of belligerence and bravery." *Proceedings of The Royal Society B*. doi:10.1098/rspb.2008.0842.