

Supporting Information

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SI Definitions of Terms and Understanding Current Debates on Evolution of Violence (Table S1 Provides Multiple Definitions and Associated Sources)

The debates on war are complex and have adherents with multiple perspectives. In general, the discussions have long passed the original Hobbes (State of Nature) vs. Rousseau (The Noble Savage) debates on the role of violence on prestate or nonstate societies (33). Otterbein (34) outlines a history of the archaeology of warfare, using the terms Hawks and Doves, to describe two camps arguing over the existence of warfare in the past. Taking a slightly different approach, Allen (35) places scholars of war in two groups: those that see a long history of warfare and those who think it is a fairly recent human invention, a matter of long vs. short chronology.

Hawks, as argued by Otterbein (34), see deep roots of coalitional violence in human societies dating to perhaps the earliest communities of hominins. Some push it even further back in time, stating that the predisposition for warfare is shared by human and chimpanzee societies, indicating a deep evolutionary basis for male aggression and coalitional violence (1, 2, 35, 36). Others see a continuum for coalitional violence across the animal kingdom, including wasps, bees, and (especially) ants (3, 37). In general, the Hawks are seen as arguing for human nature being warlike.

The Doves, however, see human nature as peaceful, with warfare evolving in the Holocene, especially after the development of settled communities, increasing social complexity, and the emergence of state and chiefdoms (38–40). However, as with the Hawks, the Doves also have a larger range of views within the groups. For example, there are those who suggest there is no evidence for coalitional violence for most pre-Holocene societies, as well as for recent foraging societies, though interpersonal violence is not ruled out (41). Some suggest that violence is a feature of very recent developments and juxtapositioning of state activities and markets (e.g., colonization, globalization, and colonialism) (40–42). In general, these scholars argue that the actions of state actors and the generation of new priorities and conflict-applicable technologies among newly encountered groups result in increased intergroups violence [e.g., the Yanomami, the Native American groups embroiled in the Fur Trade and the French Indian Wars, the various Revivalist movements and conflicts of the 19th century (Boxers in China, Santhals in India, Maji Maji in Tanzania, the Mahdi Jihad in Sudan, the Ghost Dance in the Western United States)].

The complexity of the range and the variation of views on the state of war and conflict in the human past and present make general divisions difficult. Indeed, many have critiqued the application of Hawks and Doves as prejudiced and oversimplifications of a complex debate (33, 38), although at the same time, it does provide a useful way to begin to contextualize the debate. However, as noted by Dentan (43), doves are, in fact, quite violent, and among the Semai of Malaysia, often seen as the poster group for nonviolent peoples, doves are equated with no holds barred warfare (43).

However, after Keeley (5) showed that the past was not peaceful, the debate between researchers has turned to the question of whether human societies have become more or less violent over time. In our formulation, the view, popularized recently by Pinker (6), states that, with the advent of the state [the “leviathan” in the terminology of Pinker (6)] and especially, over the past 500 y, the growth of institutions, international diplomacy, and conventions has guided and limited state actors and combatant activities, making the world more peaceful. Some

argue that both the size of armies and the number of conflict casualties have declined in proportion to the global and group population (4, 5, 7, 8). Hence, lower proportions of civilians and noncombatants (<1% on average) are affected by conflicts in state-level and contemporary societies than nonstate or past societies (5).

The scholars who oppose the views of Keeley (5) and Pinker (6) suggest that violence is a feature of social complexity (38–45), with lower rates of coalitional violence and casualties among foraging groups and increasing rates of both coalitional violence and intergroup conflict casualties in the agricultural and pastoral Neolithic (approximately 8,000–6,000 B.P.) and institutionalization of such violence during and after the emergence of large chiefdoms and states. The archaeological record, while showing a handful of well-known occurrences of warfare/interpersonal violence in the Pleistocene, is mostly silent on warfare before the Holocene, as only ~2% of skeletons from 200,000–10,000 y ago show signs of violent deaths caused by conspecifics (45).

As Nordstrom (46) points out, a major difficulty is that warfare itself is often undefined. People know what war is but not how to define it. As she notes, “the question What is war? translates on a profound level to What does it mean to be human? The way people choose to answer this question is seldom based on empirical research or ethnographic endeavor—it is based on what they think the world should, or could, be” (46).

SI Metadata and Caveats

Data on P, W, C, and G were gathered from various scholarly sources and are organized in Datasets S1–S6 (Dataset S9 shows the references). When different sources presented different estimates for P, W, C, or G, the geometric mean of the different values was used in the analysis to ensure against overestimation. We specifically mention two caveats in analyzing these data. (i) W reported for both historical states and (especially) for contemporary states where such data are available indicates the total number of individuals directly involved in conflict-related activities and includes active duty personnel, reserve forces, and support staff. (ii) W reported for ethnographic or small-scale societies indicates the number of combatants actively involved during periods of conflict as observed by ethnographers. Since during times of low/no conflict, most individuals involved in conflicts in these societies would be otherwise engaged in other specialized activities (e.g., farming, pastoralism, crafts production, ritual specialization, or foraging), these figures are regarded as equivalent to the total war group size in state-level societies undergoing conflict and/or compulsory military service.

We also note that, while it might be better to focus only on combat-related casualties, (i) the specific breakdowns are not always available, (ii) the magnitude of the total combat- and noncombat-related casualties caused by infrastructural collapse generates a special category of CL within states that matches the lethality of revenge-driven conflict in small-scale societies, and (iii) much of the evidence for conflict-related casualties and deaths in small-scale societies includes both combatant and noncombatant deaths, hence leading some to make inferences on the high CL of small-scale societies. Hence, we deliberately included total casualty rates (if known) for state-level societies to measure differences in calculated CLs between small-scale and state-level societies.

Furthermore, while we do have information on the duration (D) of each conflict in years and can thus compute the average annual rates for both number of combatants (W/D) and for casualties

Other Supporting Information Files

[Dataset S1 \(XLSX\)](#)
[Dataset S2 \(XLSX\)](#)
[Dataset S3 \(XLSX\)](#)
[Dataset S4 \(XLSX\)](#)
[Dataset S5 \(XLSX\)](#)
[Dataset S6 \(XLSX\)](#)
[Dataset S7 \(XLSX\)](#)
[Dataset S8 \(PDF\)](#)
[Dataset S9 \(PDF\)](#)