

**Life Without War**

Douglas P. Fry  
*Science* **336**, 879 (2012);  
DOI: 10.1126/science.1217987

---

*This copy is for your personal, non-commercial use only.*

---

**If you wish to distribute this article to others**, you can order high-quality copies for your colleagues, clients, or customers by [clicking here](#).

**Permission to republish or repurpose articles or portions of articles** can be obtained by following the guidelines [here](#).

**The following resources related to this article are available online at [www.sciencemag.org](http://www.sciencemag.org) (this information is current as of June 2, 2012 ):**

**Updated information and services**, including high-resolution figures, can be found in the online version of this article at:

<http://www.sciencemag.org/content/336/6083/879.full.html>

**Supporting Online Material** can be found at:

<http://www.sciencemag.org/content/suppl/2012/05/17/336.6083.879.DC1.html>

A list of selected additional articles on the Science Web sites **related to this article** can be found at:

<http://www.sciencemag.org/content/336/6083/879.full.html#related>

This article **cites 10 articles**, 4 of which can be accessed free:

<http://www.sciencemag.org/content/336/6083/879.full.html#ref-list-1>

This article appears in the following **subject collections**:

Evolution

<http://www.sciencemag.org/cgi/collection/evolution>

erosity toward those we call “us” and hostility and intolerance toward “them” (16)?

I do not think so: Our legacy need not be our fate. We could not have become what Gintis and I call a cooperative species (28) were we not, *par excellence*, a cultural animal. Among the lessons of our past are not only the grisly truths on which I have dwelled but also the fact that our us’s and them’s are not primordial. On world historic time scales, we make and unmake these pronouns of exclusion at lightning speed. For ancestral humans, making peace was no less essential than surviving wars [as Boehm points out in his contribution to this issue (29)].

The unsung virtue of European and many other forms of nationalism is that it obliterated the hundreds of petty us’s and them’s that once divided valley from valley, dialect from dialect, and even neighborhood from neighborhood (30, 31). The tricolor, the stars and stripes, and the other national banners have not, of course, put an end to intolerance and bigotry within nations. But the willingness of voters to elect members of groups whom they recently despised, exploited, fought, or enslaved, and to pay taxes to extend economic opportunity and a modicum of security to once-excluded peoples is testimony to the fragility of the parochial aspects of altruism.

Nationalism helped convince once-warring peoples—Protestant and Catholic, Florentine and Roman—to bury the hatchet, if not their differences. Paradoxically, globalism may carry a similar process across national boundaries. The parochial face of nationalism itself may be softened by the globalization of interpersonal contact and

concern, now facilitated by the shrinking of space. And if, as seems likely, democracy should continue to spread, relations among nations may come to reflect what political scientists call the democratic peace (32) and follow the less bellicose avenues of economic and cultural competition and emulation.

#### References and Notes

1. C. Darwin, *The Descent of Man* (D. Appleton and Company, New York, 1873).
2. C. Tilly, *Coercion, Capital, and European states, AD 990-1990* (B. Blackwell, Cambridge, MA, 1990).
3. V. Hui, *War and State Formation in Ancient China and Early Modern Europe* (Cambridge Univ. Press, Cambridge, 2005).
4. C. S. Spencer, *Proc. Natl. Acad. Sci. U.S.A.* **107**, 7119 (2010).
5. B. J. Moore, *Social Origins of Dictatorship and Democracy; Lord and Peasant in the Making of the Modern World* (Beacon Press, Boston, 1966).
6. G. Therborn, *New Left Rev.* **103**, 3 (1977).
7. E. J. Wood, *Forging Democracy From Below: Insurgent Transitions in South Africa and El Salvador* (Cambridge Univ. Press, Cambridge, 2000).
8. M. Beissinger, *Nationalist Mobilization and the Collapse of the Soviet State* (Cambridge Univ. Press, Cambridge, 2002).
9. R. Collier, *Paths Toward Democracy: The Working Class and Elites in Western Europe and South America* (Cambridge Univ. Press, Cambridge, 1999).
10. G. C. Williams, *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought* (Princeton Univ. Press, Princeton, NJ, 1966).
11. D. S. Wilson, E. O. Wilson, *Q. Rev. Biol.* **82**, 327 (2007).
12. E. O. Wilson, B. Hölldobler, *Proc. Natl. Acad. Sci. U.S.A.* **102**, 13367 (2005).
13. T. L. Goldberg, R. W. Wrangham, *Anim. Behav.* **54**, 559 (1997).
14. S. Bowles, *Science* **324**, 1293 (2009).

15. S. Bowles, *Science* **314**, 1569 (2006).
16. J.-K. Choi, S. Bowles, *Science* **318**, 636 (2007).
17. L. Lehmann, M. W. Feldman, *Proc. Biol. Sci.* **275**, 2877 (2008).
18. H. Bernhard, U. Fischbacher, E. Fehr, *Nature* **442**, 912 (2006).
19. C. Boehm, *Moral Origins: Social Selection and the Evolution of Virtue, Altruism, and Shame* (Basic Books, New York, 2012).
20. P. Wiessner, in *Food and the Status Quest: An Interdisciplinary Perspective* P. Wiessner, W. Schiefelohov, Eds. (Berghahn, Oxford, 1982).
21. P. Wiessner, *Hum. Nat.* **16**, 115 (2005).
22. S. Bowles, J. K. Choi, A. Hopfensitz, *J. Theor. Biol.* **223**, 135 (2003).
23. J. Bartlett, *Familiar Quotations* (Little Brown, Boston, ed. 16, 1992).
24. J. M. Smith, E. Szathmari, *The Major Transitions in Evolution* (Oxford Univ. Press, Oxford, 1995).
25. I. Eibl-Eibesfeldt, *J. Comparative Ethology* **60**, 177 (1982).
26. C. Boehm, *J. Soc. Biol. Struct.* **5**, 413 (1982).
27. S. A. Frank, *Nature* **377**, 520 (1995).
28. S. Bowles, H. Gintis, *A Cooperative Species: Human Reciprocity and its Evolution* (Princeton Univ. Press, Princeton, 2011).
29. C. Boehm, *Science* **336**, 844 (2012).
30. E. Gellner, *Nations and Nationalism: New Perspectives on the Past* (Cornell Univ. Press, Ithaca, 1983).
31. E. Weber, *Peasants into Frenchmen: The Modernization of Rural France, 1870-1914* (Stanford Univ. Press, Stanford, 1976).
32. A. Dafoe, *Am. J. Pol. Sci.* **55**, 247 (2011).

**Acknowledgments:** The author declares no competing interests and would like to thank the Behavioral Sciences Program at the Santa Fe Institute for funding; R. Allen, C. Boehm, R. Boyd, J. Cohen, S. Naidu, P. Richerson, J. Roemer, J. Sabloff, N. Sambanis, and E. Wood for valuable comments; and his teacher, the late B. Moore Jr., who sparked his interest in the topic.

10.1126/science.1217336

## REVIEW

# LIFE WITHOUT WAR

Douglas P. Fry<sup>1,2</sup>

An emerging evolutionary perspective suggests that nature and human nature are less “red in tooth and claw” than generally acknowledged by a competition-based view of the biological world. War is not always present in human societies. Peace systems, defined as groups of neighboring societies that do not make war on each other, exist on different continents. A comparison of three peace systems—the Upper Xingu River basin tribes of Brazil, the Iroquois Confederacy of upper New York State, and the European Union—highlight six features hypothesized to be important in the creation and maintenance of intersocietal peace: (i) an overarching social identity, (ii) interconnections among subgroups, (iii) interdependence, (iv) nonwarring values, (v) symbolism and ceremonies that reinforce peace, and (vi) superordinate institutions for conflict management. The existence of peace systems demonstrates that it is possible to create social systems free of war.

**W**ar—a group activity involving lethal aggression between communities—and other forms of violent conflict occur all too regularly in the 21st century and contribute substantially to human suffering. At the same time, most daily human behavior, with-

in and across societies, is nonviolent. Conflict—defined generally as perceived divergence of interests—occurs regularly within and between societies and can be handled in many ways, only a few of which involve any physical violence (1, 2). With variation from one culture to

the next, disputants, for example, may seek the help of an impartial mediator to resolve their disagreements, appear in court, negotiate the payment of compensation, or practice avoidance.

### A New Perspective

A dominant evolutionary perspective, as captured in Tennyson’s famous phrase “nature, red in tooth and claw,” has proposed that competition, often in the form of violence, is the evolutionary norm (3–7). It appears, however, that this perspective may be shifting toward a new understanding that, although not totally dismissive of self-interested competition and conflict, nonetheless draws on recent advances in evolutionary theory (3–5) and a substantial body of human and nonhuman animal data (7, 8) to show that cooperation, sharing, helping, and reconciliation also have a solid evolutionary basis (3–11).

Traditionally, warfare has been seen as ancient (12–14), but this view is also being recon-

<sup>1</sup>Peace, Mediation and Conflict Research, Department of Social Sciences, Åbo Akademi University in Vasa, Post Office Box 311, FIN-65100, Vasa, Finland. <sup>2</sup>Bureau of Applied Research in Anthropology, School of Anthropology, Post Office Box 210030, Tucson, AZ 85721-0030, USA. E-mail: dfry@abo.fi

sidered (2, 15). Chimpanzee intergroup killings have been used to make inferences about past hominid behavior (13), but ancestral hominid conflict behavior may have been more bonobo-like—that is, nonlethal—than chimp-like (3), as perhaps reflected in the small, nonprojecting canines and minimal sexual dimorphism of 4.4-million-old *Ardipithecus ramidus* (16). Likewise, humans and their predecessors have long been characterized as hunters, but recently a reconsideration of several types of evidence suggests that they might more accurately have been considered prey (10).

Similarly, a much-discussed suggestion based on Yanomamö data, that warriors have higher reproductive success than nonwarriors (17), has been reevaluated theoretically, mathematically, and empirically with the conclusion that the opposite may actually be the case (2, 15, 18, 19). First, in terms of theory, computer simulations indicate that unrestrained, escalated forms of aggression do not fare as well as strategies of limited agonism (20, 21). Second, a mathematical reanalysis of the data on the Yanomamö men in the original study revealed that those reported to have killed averaged more offspring in part because they were more than 10 years older than the men who had never killed (2). Third, attempted replications using data on the Cheyenne and the Waorani failed to support the original findings; to the contrary, fitness was found to be negatively correlated with killing (2, 18).

The evidence for a new orientation that gives cooperation and peacefulness a seat at the evolutionary table comes from a variety of sources. From ethology, studies document cooperation, empathy, and conflict resolution in various animal species (3, 7–9). Mammalian patterns of intraspecific agonism correspond with game theoretic simulations (20), namely, escalated fighting among rival conspecifics is very rare compared with the widespread use of noncontact displays and ritualized contests (wherein serious injuries or death are unlikely), and similar patterns of restraint characterize much human conflict as well (2, 21, 22). Primates, including humans, readily cooperate and reconcile after aggression, especially within social groups when partners are mutually dependent on each other (e.g., as allies in dominance struggles) (3, 7, 9, 23). A reevaluation of nomadic forager data—such as on the Yahgan of South America, the Sauteaux and Paiute of North America, the Semang and Vedda of Asia, and the Ju’hoansi and Mbuti of Africa—shows that warfare is most often absent at this ancestral level of social organization (2), whereas cooperating and helping (e.g., the sharing of meat) occur without exception in nomadic band societies (2, 24, 25). Furthermore, neurobiological research shows that humans receive an immediate biochemical reward in oxytocin for cooperating (26), and this may be part of an evolved brain-reward system in humans related to cooperation, trust,

and altruism (26). Finally, research from military science suggests that it is more difficult to get soldiers to kill in combat than commonly assumed. The resistance by soldiers to killing the enemy has been documented across various battlefield settings, for instance, among French officers in the 1860s, the battle of Gettysburg in the U.S. Civil War, soldiers from Argentina in the Falklands War, and U.S. troops during World War II (where it has been estimated that at most 25% of the combat soldiers shot at the enemy) (19, 27). The relevant point, as General S.L.A. Marshall, who studied firing rates during World War II, concluded, is that “the average and normally healthy individual...[has] an inner and usually unrealized resistance toward killing” (28). Subsequently, this reluctance to kill has been largely overcome by the U.S. military through intense training in reflexive firing (27).

In sum, the traditional focus in the evolutionary sciences has been on competition and violent conflict (5, 7); however, this perspective is shifting toward one that is more appreciative of cooperation, peacemaking, empathy, and sharing. Obviously, humans have the capacity to engage in war, but a growing body of studies on animals and humans suggests that nature is less violent than commonly has been assumed (2–5, 7–9).

### Nonwarring Societies

Ethnographically, most societies engage in warfare, but there are some that do not (2, 29). Considering the existence of nonwarring societies is

important because it demonstrates that humans are capable of living without war. Nonwarring societies can be found in various locations around the globe, for example, the Machiguenga swidden farmers of Peru (30) and the Batek of Malaysia (31). Among the Batek, core values, as evident in everyday social interaction, include helping anyone in need, respecting others, being noncompetitive and nonviolent, and sharing food (31). The Mardu Aborigines of Australia’s Great Western Desert, who were studied by Tonkinson beginning in the 1960s, had remained up until that time relatively isolated and unaffected by outside influences. The Mardu and neighboring Aborigines do not practice warfare; even the concept is alien to the Mardu because their language lacks words for feud and war (32). The types of conflicts that arise, for instance elopements or sorcery accusations, tend to be interpersonal, and the Mardu routinely resolve such grievances when several bands gather together (32). Many additional cases of nonwarring societies have been described from the Pemon and Piaroa of South America, the Kawaiisu and Karok of North America, the Central and Copper Inuit of the Arctic, and the Ladakhi and Lepcha of Asia, to nearly all Australian Aborigine societies (2). It is also worth noting that some nations (for example, Iceland, Switzerland, and Sweden) have avoided wars for generations. Thus, war is not always and everywhere present.

One robust anthropological finding is that complexity of social organization correlates positively with warfare. Hierarchical societies such as chiefdoms, kingdoms, states, and empires are more likely to engage in war and practice more severe forms of warfare than are comparatively egalitarian tribes or highly egalitarian nomadic forager bands (2). In bands, especially, numerous factors protect against war. For example, individuals have close relatives in neighboring bands, lethal disputes generally have very personal, not political, causes (e.g., due to sexual jealousy, an insult, or revenge-seeking by a homicide victim’s family), there are no caches of stored food or other goods to plunder, no one possesses the authority to command other band members to fight, and population densities tend to be very low with adequate resources spread over wide areas (2, 25).

### Peace Systems

As reflected in Table 1, peace systems—groups of neighboring societies that do not make war on each other and sometimes

**Table 1.** Examples of peace systems. Peace systems are groups of neighboring societies that do not make war on each other (and sometimes not with outsiders either). Peace systems can be found in various parts of the globe.

Geographical location	Peace system
Australia	Peoples of the Great Western Desert (e.g., the Mardudjara/Mardu, Gugadji, Walmadjeri, and Pintupi, among numerous others)
Canada	Montagnais-Naskapi and East Main Cree of the Labrador Peninsula
India	Nilgiri Plateau/Hills societies (Toda, Kota, Badaga, and Kurumbas)
Malaysia	Central Peninsular Orang Asli societies (e.g., Batek, Jahai, Semai, Chewong, and Btsisi)
Greenland	Native Inuit populations
United States and Canada	Iroquois Great League of Peace (Cayuga, Mohawk, Oneida, Onondaga, Seneca, and Tuscarora)
Brazil	Ten tribes of the Upper Xingu River basin (Kuikuru, Kalapalo, Nafukuá, Matipú, Mehinaku, Wauja, Yawalapití/Yaulapití, Kamayura/Kamaiyura, Aultí, and Trumai)
Europe	European Union (27 member countries and growing)

not with outsiders either—have been documented on different continents (33–35). Some peace systems are strictly nonwarring, whereas other peace systems are only nonwarring within the system itself. For example, the Batek, Btsisi, Chewong, Jahai, Semai and other nearby Malaysian societies constitute a peace system comprised of cultures that totally shun war (31).

In addition to ethnographic cases, peace systems are reflected in the archaeological record. For example, very complete archaeological data exist for the prehistoric Anasazi of the southwestern United States, which clearly shows the time periods when war was either absent or present. War leaves tell-tale marks such as habitation sites protected by stockades, evidence

of widespread fire or destruction, high percentages of violent death reflected in burials, and so forth (2). The archaeological record across the Anasazi cultural area from before 700 CE until almost 1200 CE shows no evidence of war (36). At the end of this period, as the climate changed to drought conditions, war appears. By the mid-13th century, in marked contrast to the preceding centuries, the evidence for war is unmistakable. Village destruction is evident, settlements have shifted to defensive locations, and lethal trauma is endemic in the skeletal population (36). After a successful 500-year run, the Anasazi peace system broke down, likely under the pressure of demographic and environmental stress.

An examination of existing peace systems can provide insights for creating peace in other settings (34). Preliminary comparisons suggest that, for some peaceful groups, nonwarring may be simply the behavioral default (passive systems), perhaps because war is traditionally unknown among the member societies, as seen in the Malaysian case mentioned previously, whereas other peace systems are more actively created and maintained (active systems).

A comparison of active peace systems suggests that common features that can be hypothesized to be important include (i) an overarching social identity, (ii) interconnections among subgroups, (iii) interdependence (ecological, economic, and/or defensive), (iv) nonwarring values, (v) symbolism and ceremonies that reinforce peace, and (vi) superordinate institutions and conflict management. Each of these features will be briefly considered using ethnographic examples from various cultures, but with a primary focus on three

**Table 2.** Features of five peace systems compared. Additional information on the three active peace systems is provided in the text. Information on the two passive peace systems is presented here for comparative purposes.

Feature	Active peace systems			Passive peace systems	
	Upper Xingu River basin	Iroquois League of Peace	European Union	Central Malaysia Orang Asli	Montagnais-Naskapi and East Main Cree
Overarching social identity	Yes	Yes	Growing	No	No
Interconnections among subgroups	Yes	Yes	Yes	?	?
Interdependence	Augmented	Augmented	Pivotal	No	No
Values for peace	Yes	Yes	Yes	Yes (nonviolence)	Not reported
Symbols, rituals, ceremonies for peace	Yes (chiefly peace myths)	Yes (Tree of Peace, rituals of condolence)	Yes (flag, anthem, Euro currency)	No	No
Intergroup conflict management	Weak: harangues, wrestling	Strong: Great Council of Chiefs, compensation	Intermediate: EU Court, Commission, Parliament	Weak: avoidance and toleration	Weak: avoidance, toleration, public opinion
Overarching governance	No	Yes (Council of Chiefs)	Yes (e.g., EU Parliament, Commission)	No	No

examples of active peace systems, the Upper Xingu River basin tribes in Brazil, the Iroquois Confederacy, and the European Union (EU) (Table 2).

All three of these peace systems have eliminated warfare within the system, but not necessarily against outsiders. The 10 Upper Xingu River basin tribes protected themselves if attacked by aggressive outsiders (37). Additionally, and as in many societies, homicide occasionally occurred, but homicide is not war. Among the original Iroquoians—the Mohawk, Oneida, Onondaga, Cayuga, and Seneca nations—archaeology and ethnohistory clearly document chronic feuding, warring, and cannibalism before the creation of the peace system put an end to the carnage within the new confederacy (38, 39). Since its beginning in the second half of the 15th century, the Iroquois Confederacy, also known as the League of Peace, “proved remarkably durable, maintaining the peace among the Iroquois for over three hundred years” (39). EU member nations have contributed troops to recent wars outside the EU borders, but the use of military force within the EU has not occurred for more than 60 years. In post-World War II Europe, as the horrific memories of widespread death, bombings, blackouts, food rationing, hunger, concentration camps, and mass graves were still fresh in the minds of the survivors, the motivation was very strong to devise a way to prevent future European wars. Thus, creating a sustainable peace was the primary driving force behind European integration. These three cases do not show a total abstention from war, but rather they illustrate how clusters of neighboring societies have successfully created peace systems among themselves.

**Identity: Expanding the Us**

The promotion of an “us-versus-them” mentality can facilitate intergroup hostility (1, 40); however, at least some successful peace systems form a common identity that helps to promote peace. For example, among the 10 tribes of the Upper Xingu River basin, which represent four different language groups, identities go beyond individual tribal membership (34, 37, 41). The societies have “expanded the us” to encompass a common identity with the other tribes.

The Iroquois also expanded the us and metaphorically referred to their confederacy as a longhouse, symbolically denoting an extended family living together in peace (42). “They sought to expand their League of Peace, and to embrace ever more people as kinsmen who would share the peace, prosperity, and security of the Iroquois Longhouse” (38). An evolving pan-Iroquois identity is reflected in many ways. As the peace system developed, the previous practice of exacting blood revenge over a homicide was replaced by the payment of compensation; the former practice of cannibalism within the system became obsolete as outsiders became insiders; the distinct pottery styles of past eras became progressively uniform across the region, reflecting a common identity; intermarriage increased, being simultaneously a cause and a result of the expanding Iroquois social identification; ritualized adoptions turned nonkin into relatives, and importantly, the use of kinship imagery and terminology supported the unifying view of all Iroquoians as relatives (38, 39).

Within the EU, a new overarching identity is emerging (39). This is evident in the issuance of EU passports, EU automobile license plates, the

Euro as a common currency (in most member countries), the free movement of EU citizens across borders, democratic elections for EU parliamentarians, and an EU flag and anthem (34). In short, the trend is toward a new pan-European identity that parallels how the Upper Xingu and the Iroquois peoples developed additional overarching social identities. Expanding the use is a powerful force in the service of peace (33, 39).

### Intergroup Ties

Intergroup bonds of friendship and kinship discourage violence (1, 33). For example, as we have seen, the Mardu of Australia do not feud or war. The Mardu bands are interlinked with each other and also with bands from neighboring societies as part of a larger kinship system, and cross-cutting ties help to promote peaceful relations among the groups (35). The intergroup ties are diverse. This is due in part to the numerous interconnections (shared values, norms, religion, cosmology, friendship, kinship, and marriage alliances) that link all Mardu bands with each other. Such commonalities and linkages greatly facilitate the resolution of disputes (32). Similarly, among the nonwarring Ju/'hoansi of Africa, everybody has kin and trade partners in other groups and, as among the Mardu, intergroup connections discourage intergroup hostility (2). Intermarriage also served a similar peace-sustaining function for the Iroquois and Upper Xingu River peace systems (33, 37, 38, 41). The emergence of a pan-Iroquois material culture reflects the progressive social integration across the confederacy (38). The general principle is that the existence of cross-cutting ties such as ceremonial unions, fictive and consanguineal kinship, economic partnerships, and friendships, decreases the chances that conflicts will result in war.

### Interdependence as a Key Factor

Interestingly, data from disciplines as diverse as primatology, anthropology, social psychology, and political science converge on showing the importance of interdependence for promoting cooperation to achieve a superordinate goal (2, 32, 40, 43), although economic interdependence may play a more important role later in the process (39). In turn, engaging in cooperation is beneficial for relationships and thus can contribute to peaceful intergroup relations (2, 34, 40, 43). There are various types of interdependence, some imposed by circumstance and some purposefully created. The harshness of the physical environment can be a unifying force. The solution in Africa's Kalahari Desert or Australia's Great Western Desert is for local groups to reciprocally allow each other access to water and food resources (2, 33). To let disputes harden into feuding or warfare under such conditions of ecological interdependence would be suicidal (2, 32).



**Fig. 1.** The Tree of Peace. The insignia on the flag of the Oneida Nation, one of the original five member societies of the Iroquois Confederacy, depicts the Tree of Peace. The Cayuga, Mohawk, Oneida, Onondaga, and Seneca (later joined by the Tuscarora) brought an end to the chronic warfare among themselves, represented ritually as they interred their war hatchets and war clubs under the Tree of Peace. An underground river washed all their weapons away, making them irretrievable, thus reflecting symbolically the five nations' commitment to unity and peace. The eagle of vigilance is shown, as are the white roots for peace, the latter symbolizing the Iroquois desire to spread peace to all the peoples of the world. The legendary prophet Deganawidah proclaimed as the weapons of war were eliminated, "We have rid the earth of these things of an Evil Mind... Thus... shall the Great Peace be established, and hostilities shall no longer be known between the Five Nations, but peace to the United People" (42).

The tribes of the Upper Xingu peace system enhance interdependence by specializing in the production of particular trade goods, such as pottery, hardwood bows, or salt, and this type of specialization creates multiple economic interdependencies among them (37). The founders of the EU augmented interdependence as part of a deliberate plan to create a new level of governance. An explicit impetus behind European integration was to eliminate the threat of war in the region (34, 44). The creative approach was to build economic and political interdependence by incrementally integrating the national economies (34). The first step, taken in the 1950s, was placing coal and steel—critical resources in times of peace and war—under supranational control. Thus began an agenda of cooperation and unification (44). Current economic challenges within the EU, such as high unemployment and debt burden in some countries, in no way diminish the success of European integration and unification in creating a continent safe from war. In Europe today, less than 70 years since World War II ravaged the continent, war among EU member nations has become highly unlikely (34). Using interdependence to delib-

erately create a regional peace system is a remarkable achievement.

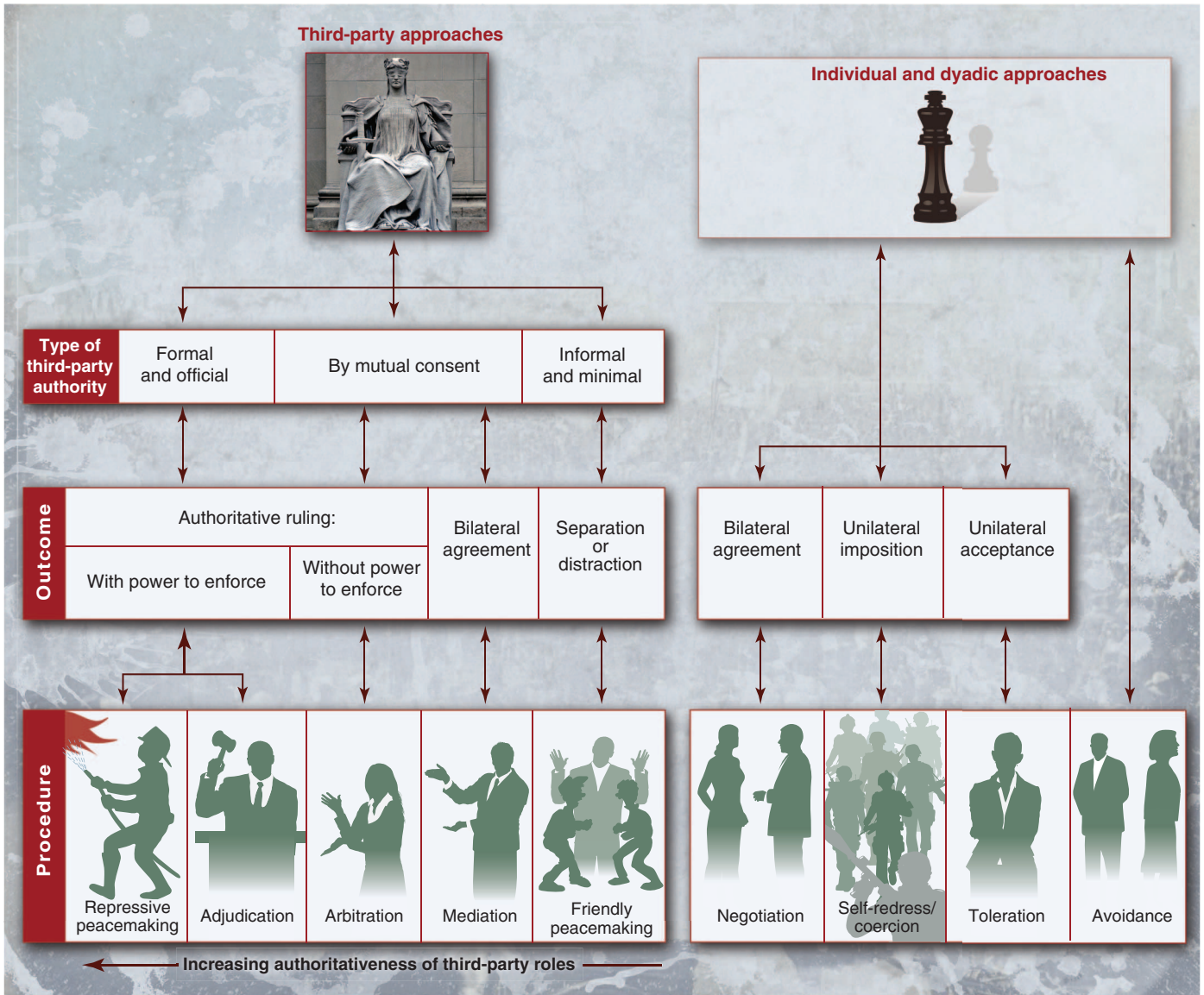
### Values for Peace

Some value orientations are more conducive to peace than others (35). In the value system of the Upper Xingu tribes, the warrior role is shunned—peace is moral, but war is not (37, 41). In that values become internalized within the minds of people and serve as guidelines for behavior, the promotion of antiwar values in society has a role to play in sustaining the peace (2, 35). The Iroquois made their value of peace within their confederacy explicit: "Thus we bury all the weapons of war out of sight, and establish the 'Great Peace.' Hostilities shall not be seen nor heard of any more among you, but 'Peace' shall be preserved among the Confederated Nations" (38).

The EU was founded with the explicit goal of bringing peace and prosperity to Europe. Peace-related values such as democracy, social equality, human rights, and respect for the law serve as the EU's moral compass, as explicitly stated: "Promoting these values, as well as peace and the well-being of the Union's peoples are now the main objectives of the Union" (45). The actualization of these values in the EU is reflected in numerous ways, including health care provided for all people, inexpensive (sometimes free) university education, a high standard of living, effective public transportation, strong democratic institutions, sufficient retirement security, affordable child care, paid parental leave, and so on (46). Rates of violent crime are much lower in the EU nations than in the United States (2). In short, a strong argument can be made that Europeans have successfully devised social institutions that promote not only peace but also respect for the law, justice, democracy, equality, and human rights among EU nations.

### Symbolism and Ceremonies for Peace

Symbols and ceremonies reinforce unity and commitment to peace. All the Upper Xingu tribes participate in ceremonies to mourn the deaths of deceased chiefs and to inaugurate new ones. Joint ceremonies help to unify the tribes and reinforce their expanded shared identity as members of the same broader peaceful society. One Xinguano expressed the intention in this way: "We don't make war; we have festivals for the chiefs to which all of the villages come. We sing, dance, trade and wrestle" (41). Like the longhouse that symbolically represented the Iroquois Confederacy as one family, the Tree of Peace was a powerful symbol for peace and unity (Fig. 1). According to an often-recounted legend, at the formation of the League of Peace, the weapons of war were buried beneath the tree and then washed away into a subterranean cavern. Symbolically, the white roots of the Tree of Peace represent the desire for peace to spread beyond the confederacy to embrace neighboring societies in all di-



**Fig. 2.** Approaches to conflict management. Approaches to conflict can entail individual, dyadic, or triadic forms. This typology shows five kinds of third-party assisted procedures (on the left) and four individual or dyad approaches (on the right). Self redress/coercion may involve purely verbal arguments or threats but sometimes entails the use of physical violence (e.g., assault, homicide, feud, or war). Most conflict management approaches do not involve the use of physical violence. Negotiation, for example, is a dyadic procedure wherein parties use techniques like problem-solving and com-

promising in an attempt to reach an agreement or a resolution of the dispute. In the triadic approaches of adjudication and arbitration, for example, third parties render formal decisions, but adjudication and arbitration differ in that judges have the authority to enforce their rulings, whereas arbitrators do not. Different approaches to conflict management are favored in different cultures, but every society, even where self redress/coercion regularly occurs, has various alternative ways to managing conflict without physical violence (49–51). [Photo credit: David Dye]

reactions (42). The eagle perched atop the Tree of Peace was a reminder that one must remain vigilant to threats to the peace. The legends and symbols of peace were regularly recounted at the meetings of the Council of Chiefs (38, 42). Whereas the Iroquois still engaged in external warfare after the confederacy was formed, the main goal was to maintain peace, security, and unity within the confederacy (39). They expressed the hope that someday the League of Peace would be extended to include all their neighbors (38, 42).

**Superordinate Institutions and Conflict Management**

Conflicts within or between groups can be addressed in different ways, most of which do not entail the use of violence, for instance, negotiation, mediation, and adjudication (Fig. 2). Moreover, higher levels of governance can be created with the effect that conflict management among constituent social units becomes more effective and less belligerent (2). The creation of the Iroquois Confederacy established a higher level

of governance consisting of a Council of Chiefs representing all five nations (and later six when the Tuscarora joined) that assembled to resolve disputes and address other political issues. In terms of structure, the Iroquois employed the same model of village and tribal councils, but scaled up to the supratribal level (39). The governing approach was built on discussion and consensus formation. Although there were places on the council for 50 chiefs from major villages across all the nations, each of the nations had only one

vote. The Iroquois core value of peace within their confederacy was personified in the decorum and actions of the Council of Chiefs, who reenacted the legend of how the prophet Deganawidah had originally shown the people of the five nations the path away from feuding and warring among themselves and toward peace, unity, and security under their Tree of Peace (38, 42).

In 1946, Winston Churchill proposed that a pan-European peace could be forged through the creation of strong trade relations and called for the creation of the United States of Europe (46, 47). Likewise, Jean Monnet realized that the centuries of warfare in Europe fundamentally stemmed from a nation-state system and, therefore, to abolish warfare in Europe, a new order with centralized, supranational institutions must be established. A number of leaders, such as Robert Schuman and Konrad Adenauer, adopted the vision of an interdependent and united Europe that would put an end to war in the region once and for all (45, 47). The EU has added a higher level of governance that includes new institutions for dealing with conflict, such as the European Court of Justice, to accomplish the superordinate goals of preventing war and promoting prosperity within the union (44, 45). In both the Iroquois and EU cases, the key was to create a higher-order level of governance, along with a new common identity and a new unity of purpose, to bring about an end to war and to guarantee peace and security within the system. In fact, the same process has taken place in the formation of the United States from 13 original colonies each initially having their own social identities. In the United States today, it is taken for granted that crimes and disputes will be handled through a hierarchy of courts that range from the municipal, state, and district level to the Supreme Court. President Harry Truman once observed, "When Kansas and Colorado have a quarrel over the water in the Arkansas River, they don't call out the National Guard in each state and go to war over it. They bring suit in the Supreme Court of the United States and abide by the decision. There isn't a reason in the world why we cannot do that internationally" (48).

## Conclusion

Can humanity exist without war? Some completely nonwarring societies and peace systems, such as the tribes of India's Nilgiri and Wynaad plateaus, the Orang Asli societies of mainland Malaysia, and the Australian Aborigines of the Great Western Desert, suggest that this is possible. Furthermore, the Upper Xingu peoples, Iroquois Confederacy, and EU are not mere utopian fantasies; they represent real-world clusters of neighboring societies that live together without war within their peace systems. They have found similar multifaceted paths to successfully keep the peace. These peace systems represent new perspectives and possibilities for living without war that play on the necessity for cooperation under conditions of interdependence.

Could a global peace system be created to abolish war from the planet? Theoretically, this could be done. The people of the earth today face some of the same challenges that Europeans successfully addressed after World War II. Specifically, how can we create security, peace, and prosperity among former enemies and nations with different languages, customs, and cultural traditions? In the 21st century, humanity must determine how to live without war and work together to solve shared challenges like global warming, oceanic pollution, deforestation, desertification, and biodiversity loss that not only threaten particular regions but ultimately endanger human survival overall. When it comes to such threats, all peoples on Earth are interdependent.

Constructing a peace system for the entire planet would involve many synergistic elements, including the transformative vision that a new peace-based global system is in fact possible, the understanding that interdependence and common challenges require cooperation, an added level of social identity that includes all human beings and encompasses more than mere national patriotism, the creation of effective democratic and judicial procedures at a supranational level, and the development of values and symbols that not only sustain peace and justice for all but also relegate the institution of war, like slavery before it, to the pages of history.

## References and Notes

- J. Rubin, D. Pruitt, S. H. Kim, *Social Conflict* (McGraw-Hill, New York, ed. 2, 1994).
- D. P. Fry, *The Human Potential for Peace* (Oxford Univ. Press, New York, 2006).
- F. de Waal, *The Age of Empathy* (Harmony Books, New York, 2009).
- M. A. Nowak, with R. Highfield, *SuperCooperators* (Free Press, New York, 2011).
- R. W. Sussman, C. R. Cloninger, Eds., *Origins of Altruism and Cooperation* (Springer, New York, 2011).
- S. Bowles, H. Gintis, *A Cooperative Species* (Princeton Univ. Press, Princeton, NJ, 2011).
- M. Bekoff, J. Pierce, *Wild Justice* (Univ. of Chicago Press, Chicago, 2009).
- F. de Waal, *Peacemaking Among Primates* (Harvard Univ. Press, Cambridge, MA, 1989).
- P. Verbeek, *Behaviour* **145**, 1497 (2008).
- D. Hart, R. W. Sussman, in *Origins of Altruism and Cooperation*, R. W. Sussman, C. R. Cloninger, Eds. (Springer, New York, 2011), pp. 19–40.
- K. Weiss, A. Buchanan, *The Mermaid's Tale* (Harvard Univ. Press, Cambridge, MA, 2009).
- C. Ember, *Ethnology* **17**, 439 (1978).
- R. Wrangham, D. Peterson, *Demonic Males* (Houghton Mifflin, Boston, 1996).
- S. Pinker, *The Better Angels of Our Nature* (Viking, New York, 2011).
- R. B. Ferguson, in *Origins of Altruism and Cooperation*, R. W. Sussman, C. R. Cloninger, Eds. (Springer, New York, 2011), pp. 248–270.
- T. D. White et al., *Science* **326**, 64 (2009).
- N. A. Chagnon, *Science* **239**, 985 (1988).
- S. Beckerman et al., *Proc. Natl. Acad. Sci. U.S.A.* **106**, 8134 (2009).
- M. Miklikowska, D. P. Fry, in *Nonkilling Psychology*, D. J. Christie, J. E. Pim, Eds. (Center for Global Nonkilling, Honolulu, 2012), pp. 43–70.
- J. Maynard Smith, G. Price, *Nature* **246**, 15 (1973).
- D. P. Fry, G. Schober, K. Björkqvist, in *Nonkilling Societies*, J. E. Pim, Ed. (Center for Global Nonkilling, Honolulu, 2010), pp. 101–128.
- P. Roscoe, *Am. Anthropol.* **109**, 485 (2007).
- J. B. Silk et al., *Proc. Biol. Sci.* **276**, 3099 (2009).
- S. Hrdy, *Mothers and Others* (Harvard Univ. Press, Cambridge, MA, 2009).
- D. P. Fry, in *Origins of Altruism and Cooperation*, R. W. Sussman, C. R. Cloninger, Eds. (Springer, New York, 2011), pp. 227–247.
- J. Rilling, in *Origins of Altruism and Cooperation*, R. W. Sussman, C. R. Cloninger, Eds. (Springer, New York, 2011), pp. 295–306.
- D. Grossman, *On Killing* (Little Brown, New York, Rev. ed., 2009).
- S. Marshall, *Men Against Fire* (Univ. of Oklahoma Press, Norman, 2000).
- Q. Wright, *A Study of War* (Univ. of Chicago Press, Chicago, 1942).
- A. Johnson, in *Adaptive Responses of Native Amazonians*, R. Hames, W. Vickers, Eds. (Academic Press, New York, 1983), pp. 61–63.
- K. Endicott, K. Endicott, *The Headman Was a Woman* (Waveland, Long Grove, IL, 2008).
- R. Tonkinson, in *Keeping the Peace*, G. Kemp, D. P. Fry, Eds. (Routledge, New York, 2004), pp. 89–104.
- D. P. Fry, B. Bonta, K. Baszarkiewicz, in *Handbook on Building Cultures of Peace*, Joseph de Rivera, Ed. (Springer, New York, 2009).
- D. P. Fry, *J. Aggression, Conflict, Peace Res.* **1**, 4 (2009).
- M. Miklikowska, D. P. Fry, *Beliefs and Values* **2**, 124 (2010).
- J. Haas, in *Ancient Warfare*, J. Carman, A. Harding, Eds. (Sutton, Gloucestershire, UK, 1999), pp. 11–24.
- T. Gregor, in *The Anthropology of Peace and Nonviolence*, L. Sponsel, T. Gregor, Eds. (Lynne Rienner, Boulder, CO, 1994).
- M. Dennis, *Creating a Landscape of Peace* (Cornell Univ. Press, Ithaca, 1993).
- C. Kupchan, *How Enemies Become Friends* (Princeton Univ. Press, Princeton, NJ, 2010).
- M. Sherif et al., *The Robbers Cave Experiment: Intergroup Conflict and Cooperation* (Wesleyan Univ. Press, Middletown, CT, 1988).
- T. Gregor, in *The Anthropology of War*, J. Haas, Ed. (Cambridge Univ. Press, Cambridge, 1990), pp. 105–124.
- P. Wallace, *White Roots of Peace* (Clear Light, Santa Fe, NM, 1994).
- J. D. Sachs, *Common Wealth* (Penguin, New York, 2008).
- A. Staab, *The European Union Explained* (Indiana Univ. Press, Bloomington, IN, 2008).
- Europa, *Treaty of Lisbon: A Europe of Rights and Values*. Accessed Feb. 15, 2012 at [http://europa.eu/press/pr/2007/02/15\\_eu\\_treaty\\_of\\_lisbon\\_en.htm](http://europa.eu/press/pr/2007/02/15_eu_treaty_of_lisbon_en.htm).
- S. Hill, *Europe's Promise* (Univ. of California Press, Berkeley, 2010).
- T. Reid, *The United States of Europe* (Penguin, New York, 2004).
- T. Hudgens, *We Need Law* (BILC Corporation, Denver, 1986).
- K.-F. Koch, *War and Peace in Jalemo* (Harvard Univ. Press, Cambridge, MA, 1974).
- D. Black, *The Social Structure of Right and Wrong* (Academic Press, San Diego, 1993).
- D. P. Fry, in *Natural Conflict Resolution*, F. Aureli, F. de Waal, Eds. (Univ. of California Press, Berkeley, 2000), pp. 334–351.

**Acknowledgments:** I thank M. Dennis for graciously sharing his knowledge about the Iroquois Confederacy, my colleagues and students at Åbo Akademi University for fruitful discussions, and three anonymous reviewers for their input. Some of the data reported in this paper were collected during research funded by the National Science Foundation (grant 03-13670).

10.1126/science.1217987