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WAR

Male Age Composition and Severity of Conflicts

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Abstract. **From a behavioral ecology perspective, all forms of warfare are instances of collective aggression perpetrated predominantly by coalitions of young men. Such coalitions are manifestations of cross-cultural sex differences in aggressive behavior and may be conceptualized as a form of intrasexual competition, occasionally to obtain mates, but more often to acquire resources for the attraction and retention of mates. All societies have young males, yet wars are discrete events that can take place even after long periods of peace. Therefore, an additional factor is needed to explain the episodic nature of the phenomenon. We have proposed (Mesquida and Wiener, 1996) that the most reliable factor in explaining episodes of coalitional aggression is the relative abundance of young males. In this article, we present additional evidence to that effect. The ratio of the number of men ages 15 to 29 years of age versus men 30 and older in a population appears to be associated with the occurrence and severity of conflicts as measured by the number of war casualties. A series of analyses of demographic and war casualty data indicates that the relative prevalence of young men consistently accounts for more than one third of the variance in severity of conflicts.**

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The application of sexual-selection theory to human behavior has been the greatest success story in evolutionary psychology, and one of the most fruitful and fascinating developments in the human sciences over the last two decades.

Geoffrey F. Miller (1998)

The most highly organized and largest scale human collective or social action is coalitional aggression, or war. Wars are sometimes between nations, but they can be between any other politically and socially defined groups. Interstate, civil, modern, and prehistoric wars are all instances of coalitional aggression, although there are considerable differences in their levels of planning, discipline, strategies, and tactics. The appearance of deadly coalitional aggression in the chimpanzee, our closest animal relative, suggests that the cognitive and emotional capacity for such behavior predates the evolution of modern *Homo sapiens* (Manson and Wrangham, 1991; van der Dennen, 1995).

The majority of deadly human violence is, and seems always to have been, committed by young adult men and directed toward other men. Whenever and wherever there is violence, whether individual or collective, young and usually unmarried males are most often the perpetrators. All cultures have young unmarried men, and yet collective aggression is unevenly distributed in time and space. Since violence is intermittent and often interrupts relatively long periods of peace, any theory of the origin and function of war must address both its ubiquity and intermittence. If the potential for coalitional aggression is a human male universal derived from human evolutionary history, ubiquity is explained, and if it is environmentally contingent, the intermittence is to be expected. From a Darwinian perspective, war may be conceptualized as a form of intrasexual male between-group competition, occasionally to obtain mates, but more often to acquire the culturally appropriate resources to attract and retain mates.

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Coalitional aggression—violence perpetrated by groups rather than individuals—is likely to have evolved in the ancestral environments because participants enhanced their fitness by gaining, relative to nonparticipants, access to more reproductive resources. The cognitive/affective processes that govern coalitional aggression need not be considered biologically primitive but may be the same or similar to those which account for other intensely social behaviors exhibited by our species. These subrational or unconscious cognitive/affective algorithms respond to adaptively important circumstances, such as local demographic characteristics. We propose that a high proportion of young males represents a significant demographic characteristic that is likely to increase interactions between individuals in this high-risk group.

It has often been argued that the roots of war are to be found in rapid population growth, which, when combined with fixed or slow-growing resource availability, increases the disposition to war (Choucri and North, 1975; Colinvaux, 1980; Ehrlich and Holden, 1977; Homer-Dixon, Boutwell, and Rathjens, 1993; McNeil, 1983; Vayda, 1976). A refutation of the same demographic argument may be found in the writings of Wright (1965), Sillitoe (1977), Leroy (1978), and Durham (1979). Although there is disagreement regarding the degree of demographic determinism of war and the significance of resource scarcity and distribution as the cause of violent conflict, the socioecological approaches agree that group conflicts develop over material resources. But what remains contentious are which aspects of population and resources are the correlates of war, and why there are such correlates.

Background and Rationale

A central principle of behavioral ecology is that males and females of all species must solve certain problems in order to survive and reproduce. These adaptive problems are categorized as somatic effort for growth, maintenance and survival, and reproductive effort (Williams, 1966; Alexander and Borgia, 1979). Reproductive effort can be divided into mating effort, which involves the acquisition of resources for attracting a mate and mating, and parental effort, which is gestation and postnatal care of offspring. Males and females of many animal species differ in their initial parental investment, with females committing greater time and energy to parenting; but in other species males can and do provide substantial resources for the nurturing of the young (Trivers, 1972).

The application of evolutionary theory, and more specifically sexual-selection theory, to human social behavior, particularly mating behavior, is a relatively recent development in the biological and behavioral sciences (Buss, 1987; Grammer, 1989; Irons, 1983; Miller, 1998; Symons, 1979). Sexual selection refers to competition within a sex to acquire matings. The intrasexual competition may be over direct access to the other sex, over being chosen by the other sex, or both. Although most humans form pair bonds that persist through repeated reproductive episodes, the costs differ for each sex. The early survival of offspring is obviously dependent on maternal care, but such care is more difficult without a partner. For the female, male protection and provisioning reduces the energetic cost of maternity. There is ample evidence that women prefer as mates men who control resources or who possess attributes known to be linked with resource acquisition (Betzig, 1988; Buss, 1989; Townsend, 1989). In other words, women prefer men who are capable of provisioning.

Competition for mates is greatest just before the usual age of marriage; young males must compete for connubial resources among themselves, and also with older males who control the political and economic resources of society

Because women place more emphasis on a male's existing or potential material resources than on any other criterion for mate selection, there should be an association between a man's socioeconomic status and his reproductive success. The resources a male can control are in fact a determining influence on the frequency and duration of his mating relationships. In polygynous societies it is usually those men who hold the largest share of the wealth who have the most wives (Irons, 1983). In nineteenth century Sweden, landowners were more likely to marry than the landless, and they married younger women—women with more reproductive potential (Low, 1990). In some cultures, wealthier men have more stable relationships (Clarke, 1957; Smith, 1962), and in modern societies, materially successful males will often marry a succession of young women in what can be described as a form of serial monogamy (Lockard and Adams, 1981).

The ultimate, or evolutionary reason for economic and political striving may be mate acquisition (Betzig, 1985; Chagnon, 1990); and evidence suggests that male competition for wealth and dominance (the ability to win conflicts of interest) occurs within most societies. Men with few material assets may be more inclined to undertake risk in order to increase their access to resources, and competition can be driven to lethal levels. Daly and Wilson (1994) argue that the dangerous, confrontational, competitive behaviors of young males—especially the unmarried and unemployed—should be expected where low-risk alternative behaviors are likely to produce no reproductive payoff. The term "young male syndrome" has been coined to describe dangerous acts that may be adaptive choices when such acts can enhance fitness (Wilson and Daly, 1985).

Young men are inclined to participate in confrontational coalitions with other young men to gain mates (Murdock, 1949; Chagnon, 1988) or, more frequently, to obtain material and status resources that are needed to obtain a mate (Betzig, 1988; Low, 1993). Male coalitions are likely to be associated with resources that can be effectively pursued or protected by male groups (Low, 1993; Manson and Wrangham, 1991). Low (1993) suggests that warfare may have evolved in circumstances in which reproductive gains were worth lethal risk. It may allow participants to promote their fitness by gaining access to disputed reproduction-enhancing resources that would otherwise be denied to them (Tooby and Cosmides, 1988).

Competition for mates is greatest just before the usual age of marriage; young males must compete for connubial resources among themselves, and also with older males who control the political and economic resources of society. It is therefore possible that war efforts are instigated by young, unmarried men, for purely selfish reasons. This, in fact, would go a long way in explaining why violent intergroup conflicts are executed almost exclusively by young males, often under the supervision of older, more established leaders. Political leaders, contrary to what is traditionally assumed, may not actually foment wars. But because they are themselves threatened by the young men, they may attempt to divert the coalitions against other targets.

Periodicity of War and Population Age

All societies have young men, and young men usually have fewer resources than older men. Yet many, if not most societies are at peace for long periods of time. War is not an incessant phenomenon; rather, it is intermittent. Some historians have argued that the presence of a large number of adolescents and young adults is likely to influence political affairs so as to generate frequent violent conflicts (Bouthoul, 1968; Moller, 1967/68). Moller proposed that there is a cause-and-effect relationship between increases in the proportion of young adults in a population and political instability. The young, he argues, have more to gain and less to lose as a consequence of collective violence than do their elders. Moller did not, however, address the question of why it is young males in particular who engage in collective risk taking, nor did he look at the potential costs and benefits to the young participants.

In this article, we hypothesize that the waxing and waning of coalitional aggression is likely to be a function of changes in the proportion of young men within a society. If coalitional aggression is a strategy adopted by the participants to secure necessary reproductive resources, then the larger the number of young men relative to older and more established men, the greater the chances that coalitional aggression will manifest itself. Moller (1967/68) proposed that a useful measure of the relative abundance of young adults is the ratio of those aged 15 to 29 for every 100 adults 30 years of age and older. Specifically, it has been found that age composition of the male population is a critical ecological/demographic factor determining a population's tendency to engage in coalitional aggression (Mesquida and Wiener, 1996). An expansion of earlier research into the demographic correlates of coalitional aggression is presented here. A new series of analyses have been performed on a larger sample of countries and some tribal societies. Again, the approach involves correlational analyses between the young/old ratio and the level of coalitional aggression as measured by the number of reported conflict-related deaths.

Definition and Measurement of Variables

The population pyramid, or age pyramid, is a bar graph that represents a population's age distribution. The lowest level denotes the youngest group, and each higher level represents increasingly older age groups. Demographers typically represent each five year age group with a bar. The relative abundance of young males can be expressed numerically as the relative proportion of men 15-29 years of age to those 30+. This ratio is a convenient measure of the relative abundance of young men, and it reflects the steepness of the population pyramid. Figure 1 shows the male side of the age pyramid of two demographically different countries (El Salvador and Sweden), and it shows the corresponding male population ratios. The demographic data for Figure 1 were obtained from the United Nations *Demographic Yearbook 1986*. For the analyses presented in the following pages, the post-1946 demographic figures used to calculate the ratio were obtained from the United Nations Demographic Yearbooks, as well as from the International Data Base of the U.S. Census Bureau. The pre-1946 figures were obtained from *International Historical Statistics* (Mitchell, 1982, 1983, 1995). These data sources present a breakdown of national populations by age and sex.

The measure of the magnitude of conflicts is combat fatalities. Severity, or the total number of combat deaths, is a demographic variable representing the total number of people killed during a violent conflict; it has been used by others to test the validity of war hypotheses (Singer and Small, 1972; Levy, 1983). Severity figures on war-related deaths were obtained from sources such as *World Military and Social Expenditures* (Sivard, 1988), *Measuring Social Values* (Sullivan, 1991), *World Handbook of Political and Social Indicators* (Taylor and Hudson 1972), and a "List of 366 Major Armed Conflicts of the Period 1740-1974" (Bouthoul and Carrere, 1978). Whenever the severity had not been previously tabulated, the source for estimates was *Facts on File: World News Digest* (1980 to present).

The quality of demographic and combat fatalities data do vary, but even approximations are adequate for comparative analyses. It is important for the analyses that the demographic and combat severity data be synchronous. The young/old ratio can remain stable for long periods of time,

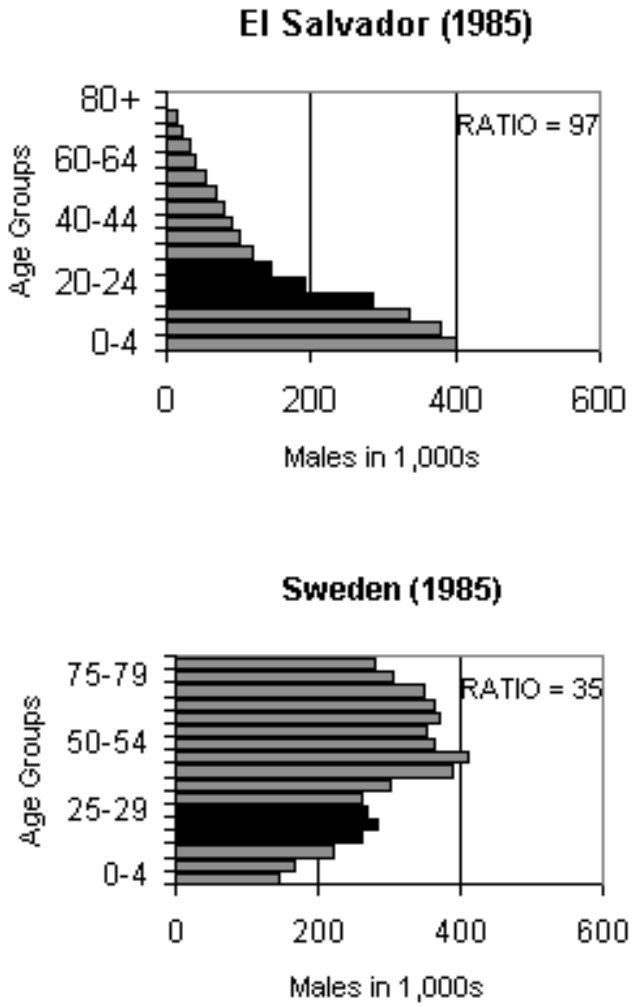

Figure 1. Male Age Pyramids for El Salvador and Sweden, 1985

Note: Among human populations, a pyramid with sloping sides and wide base characterizes an expanding population with many young men (El Salvador). A pyramid maintaining more or less the same width throughout indicates a stable pupulation with relatively fewer young men (Sweden)

but episodes of collective aggression can be both severe and brief; and they can take place a few years before or after the year in which the population statistics were collected. Severity figures used here reflect a period of at least ten years (usually five years before and five years after the population figures). Severity estimates are divided by the population size in millions to give severity figures per million.

Samples

The scatterplot in Figure 2 represents a data set composed of 30 countries, for which the severity was calculated over the period 1981-1993. The population data were drawn from UN

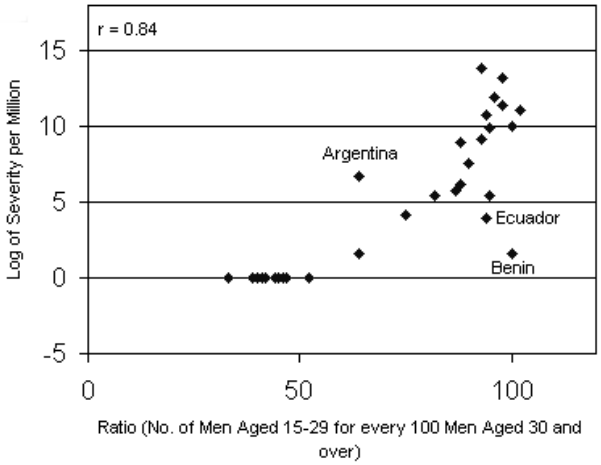

Figure 2. The Young/Old Male Ratio for 30 Countries Plotted against the Severity of Conflicts (log)

Demographic Yearbook 1986, and the data set is composed of the first 30 entries in the alphabetical list of countries. Three outliers, Argentina, Benin, and Ecuador, appear on the scatterplot. But Benin and Ecuador, both of which showed no mortality between 1981 and 1993, experienced episodes of coalitional aggression in 1994 and 1995 respectively, shortly after our cutoff date for severity. Argentina has been relatively peaceful since the Falkland War. Its population today resembles that of developed countries and has now moved to the left of the graph. As can be appreciated, the relationship between the two variables is not perfectly linear, but the linear component may be strong enough that not much is lost by ignoring the curvilinear component.

The data set presented in Figure 3 is a sample dictated by geography; it is composed of the world's 15 major island nations. The population and severity data are from the 1980s. This arbitrary bundle shows the same clustering of countries with rectangular age distributions on the bottom left of the scatterplot, and those nations with steep pyramidal

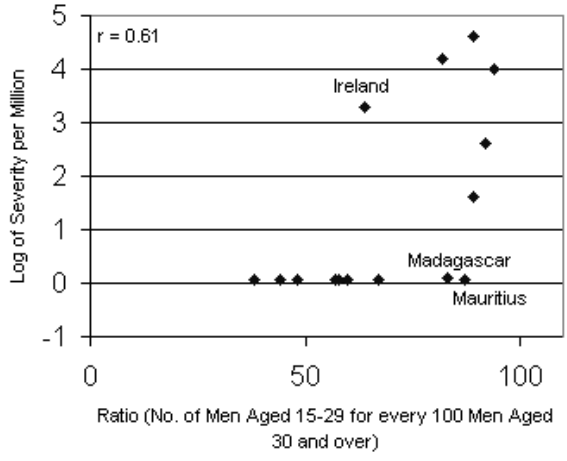

Figure 3. The Young/Old Male Ratio for 15 Island Nations Plotted against the Severity of Conflicts (log)

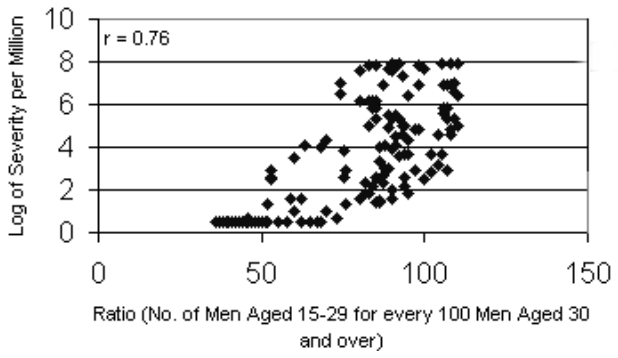

Figure 4. The Young/Old Male Ratio of 153 Countries Plotted against the Severity of Conflicts (log)

distributions on the top right. The three obvious outliers are Ireland, Madagascar, and Mauritius. Most recently, the population of Ireland has been stabilizing, and the population pyramid of the country is beginning to look more like that of the rest of Europe.

The scatterplot in Figure 4 represents 153 countries for which the severity of conflicts was calculated over the 1989-1998 period. The population figures are for 1990. This census is all the states with more than one million inhabitants and makes up 99% of the world's population. Such a data set is no longer a sample; it can be considered to be the population of independent countries.

It is important to point out that the severity figures for this data set represent only combat deaths that occurred as a consequence of civil war. During the period 1989-1998, the only international conflict was the one between Iraq and Kuwait. In order to simplify the problem associated with accurately determining the share of responsibilities for the casualties, the severity figures for that conflict were not included in the data set. Instead, combat deaths attributed to Iraq were those that resulted from civil conflicts with the Kurds and other ethnic minorities. No combat deaths were associated with Kuwait, whose young/old ratio was 58 in 1990. By comparison, in 1990, the young/old ratio for Iraq was 110.

War in Tribal Societies

From an evolutionary point of view, state and non-state warfare—despite numerous differences—are instances of young male coalitional aggression generated by evolved behavioral predispositions and elicited by comparable demographic circumstances. The frequency and intensity of tribal war is known to vary considerably from group to group over time and space. Population data for tribal societies are sometimes published as population pyramids. These pyramids often do not show the smooth regularities across the age groups, possibly because of high mortality within the population due to contact with the outside world, migration of parts of the population, and the lack of numbering systems and interest in recording or remembering age on the part of the population members. Although both mortality figures and population pyramids for tribal societies are not plentiful, some data do exist. A search of the anthropological literature yielded a number of cases in which tribes were characterized by the anthropologists responsible for the surveys as "warlike" or "peaceful" at the time of a population census (see the sixth column in Table 1 for references). As expected, societies with lower ratio values are "peaceful" and those with higher ratio values are "warlike."

Alternate Explanations and Data Sets

It has often been pointed out that the causal relationship between population parameters and conflict is likely to be

Table 1. The Young/Old Male Ratio and Conflict Characteristics at the Time of Census for 12 Tribal Societies

Tribal Society	Geographical Area	Period of Census	Ratio	Characteristic at Time of Census	Source of Census
Dobe !Kung	Southern Africa	1966	55	Peaceful	Howell, 1979
Cheyenne (Peace Band)	U.S. Midwest	1892	66	Peaceful	Moore, 1990
Hazda	East Africa	1985	69	Peaceful	Blurton Jones et al., 1992
Semai Senoi	Malaysia	1965	73	Peaceful	Fix, 1977
Etoro	New Guinea	1968	75	Peaceful	Kelly, 1977
Tiwi	Northern Australia	1903	81	Warlike	Hart and Pilling, 1960
Maring	New Guinea	1963	94	Warlike	Rappaport, 1967
Cheyenne (War Band)	U.S. Midwest	1892	100	Warlike	Moore, 1990
Ache	Paraguay	1960	112	Warlike	Hill and Hurtado 1996
Dinka	Southern Sudan	1954	127	Warlike	Roberts, 1956
Yanomami	Venezuela	1958	176	Warlike	Early and Peters, 1990
Xavante	Brazil	1965	220	Warlike	Neel and Chagnon, 1968

Note: A ratio of 100 indicates that one half of the adult male population is between 15 and 29.

Table 2. Correlations between Severity of Conflicts and Young/Old Ratio, GNP per Capita, and the GINI Coefficient for Various Years or Periods

Variable	Late 1800s	1910	1930	1950	1965	1975	1986
Young/Old Ratio	.84 (15)	.69 (20)	.67 (20)	.57 (50)	.65 (25)	.52 (26)	.60 (88)
GNP per capita	–	–	–	–.69 (20)	–.62 (25)	–.54 (26)	–.50 (88)
GINI coefficient	–	–	–	–	.47 (25)	.24 (26)	.33 (88)

Note: Sample sizes appear in parentheses. This table shows correlations between severity of conflicts and the young/old ratio for several of our own data sets covering the late nineteenth century to 1986. It also shows a smaller series of correlational analyses between severity of conflicts and GNP per capita, as well as correlations between severity of conflicts and GINI coefficient for some of the same data sets. GNP per capita figures were found in Glossop, 1987, and GINI coefficient figures in Krahn et al., 1986.

complicated and to involve many intervening variables (Durham, 1979; Leroy, 1978; Sillitoe, 1977). More than just age composition could be at the root of societal violence, and economic indicators such as GNP per capita, unemployment, and the GINI index of economic inequality may also correlate with collective aggression episodes. The GINI coefficient is based on the statistical idea known as "mean difference" of a population (Kendall and Stuart, 1963); it is a measure of the unequal income distribution within a particular society. The index is scaled to vary from zero to one (zero representing no income inequality and one representing the maximum possible income inequality). At the present time, those countries with broad-based pyramidal population structures are also those that are relatively poor. It is possible that the correlations between population structure and conflict severity, reported here, reflect a correlation of poverty with conflict severity. Our hypothesis, in fact, suggests that young males participate in collective aggression in order to obtain resources. Therefore, it should be expected that economic variables would correlate with collective aggression. Indeed, we do find correlations between GNP per capita and severity of conflicts, as well as correlations between GINI coefficient and severity of conflicts.

In Table 2, the correlations between GNP per capita and severity of conflicts (log) are rather high, as are some of the correlations with the GINI coefficient. A multiple regression analysis of the three factors (male ratio, GNP per capita, and GINI) was performed on the 1986 data set in Table 2, to determine the independent contribution of each of the variables to the prediction of the dependent variable after adjusting for the others. Table 3 shows little support for either income inequality or resource deprivation *per se,* as predictors of collective aggression. This indicates that the two factors may not be genuine confounding variables.

A data set composed of 20 countries with roughly the same GNP per capita of between $1000 and $2000 is presented in Figures 5-8. When GNP per capita is held constant (Figure 5), the correlation with male population ratio remains high (r = 0.516). The GNP per capita figures for this study can be found in Glossop (1987). The other scatterplots in Figures 6-8 are attempts to control for various factors that have been advanced as possible causal variables. For instance, Figure 6 shows that when the GINI coefficient is held constant, the correlation between ratio and severity of conflicts remains high (r = 0.837). The GINI coefficient used in this data set was published in Krahn et al. (1986).

The notion that the absence of democratic institutions is an important component in the emergence of violent conflicts has become fashionable. The existence of democracy indexes inspired the analysis in Figure 7, which shows that the correlation between severity of conflict and age ratio remains high (r = 0.608) even when level of democracy is held constant. The democracy index values used to construct this data set were published in Bollen (1980). Finally, the graph in Figure 8 is an attempt to control for the possible influence of population density. Here again, the correlation between the young/old ratio is fairly high (r = 0.637), indicating that

Table 3. Multiple Regression Results after Adjusting for GNP Per Capita and GINI Coefficient

Independent Variable	Regression Coefficient	Standard Errors	t(84)	p-level
Young/Old Ratio	.579	.1676	3.456	.00086
GNP per capita	–.031	.1520	–0.200	.84173
GINI coefficient	–.008	.1059	–0.075	.94052

Note: Multiple regression estimates for our model, with severity data from the 1980s (n = 88). The coefficient of multiple correlation is R = 0.6, and the regression coefficient for young/old ratio is the only significant coefficient at $p < .05$.

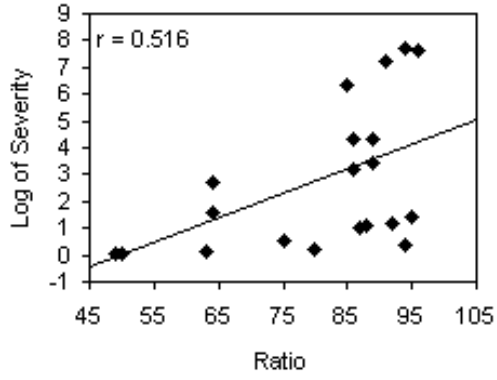

Figure 5. Scatterplot Illustrating the Influence of Male Age Distribution on Severity of Conflict When Controlling for GNP per Capita

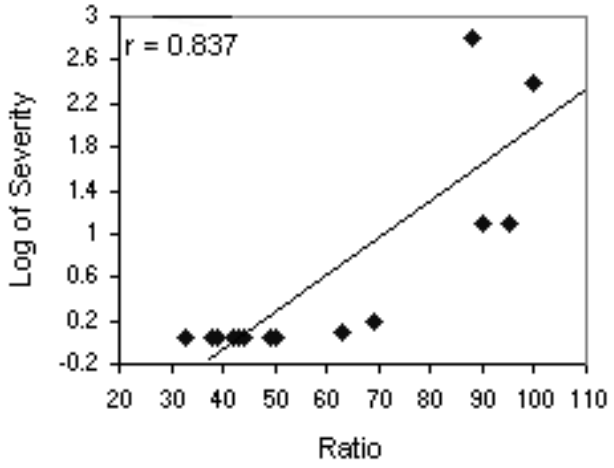

Figure 6. Scatterplot Illustrating the Influence of Male Age Distribution on Severity of Conflict When Controlling for GINI Coefficient

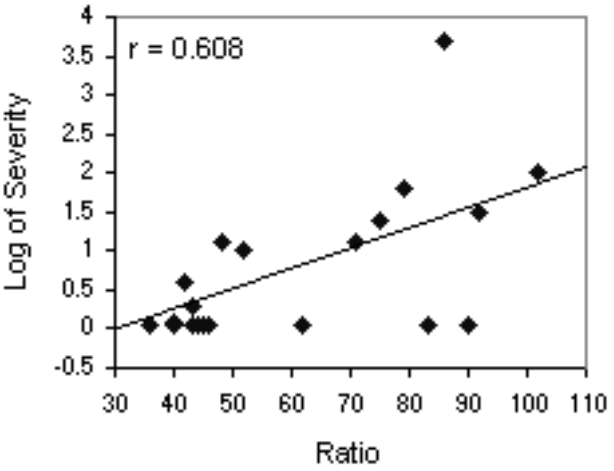

Figure 7. Scatterplot Illustrating the Influence of Male Age Distribution on Severity of Conflict When Controlling for Democracy Index Score

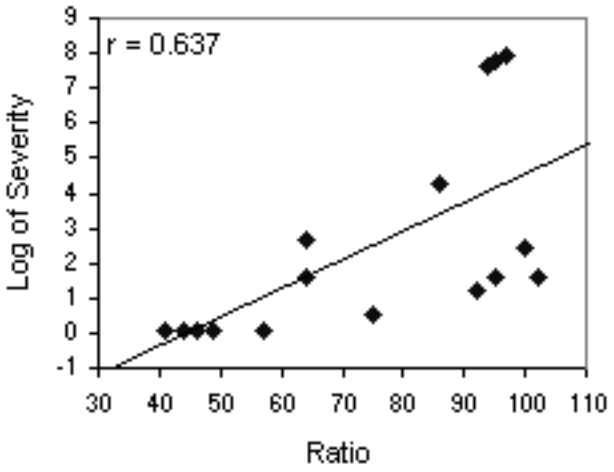

Figure 8. Scatterplot Illustrating the Influence of Male Age Distribution on Severity of Conflict When Controlling for Population Density

population density is not an important factor in the genesis of violent conflicts. Population density figures were published in Kidron and Segal (1995).

Conclusion and Discussion

The results presented here reinforce the position that the relative abundance of young men is associated with occurrence of coalitional aggression and the severity of conflicts as measured by reported casualties. A relatively large number of young men in a society, usually caused by rapid population growth, is therefore suggested as being at the origin of the formation of aggressive young male coalitions. We propose that changes within societies in the relative numbers of young men contribute importantly to the periodicity of violent conflicts. This view is somewhat compatible with hypotheses that relative deprivation or social inequalities account for collective violence, but multiple regression analyses indicate that young male/older male population ratio accounts for a larger part of the variance in collective violence.

There are always conflicts of interest between and within societies, and yet such conflicts do not inevitably lead to violence. Evolved human psychology predisposes humans to nonviolent behavior as much as to violent behavior. Thus, these findings do not at all imply that collective aggression is inevitable. Without a high proportion of young males, societies are unlikely to initiate or sustain collective aggression. Conversely, the presence of a high proportion of young males is a necessary condition for the emergence of violent conflicts, even though it may not be a sufficient condition. When a population stablilizes, offensive coalitional aggression becomes improbable, even though defensive posturing may continue to be high.

Each war is a discrete historical episode with unique biopsychosocial features, but that does not preclude generalizations about the nature of war as a phenomenon. Discrete events can be understood with general principles. *Polemology* is the term applied to the analysis of war as a phenomenon resulting from an interplay of biological, social, and psychological factors (Bouthoul, 1970). Polemology is not unlike epidemiology in that wars, like infectious diseases, are regularly occurring natural phenomena that have explanations in the realms of biology, psychology, demography, economics, and political science. Just as infectious disease is natural, but neither immutable nor unpreventable, the same can be true for war. The findings presented here form the basis of an explanatory and predictive categorization of all human populations according to their potential for the manifestation of coalitional aggression.

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References

Alexander, R.D. and G. Borgia (1979). "On the Origin and Basis of the Male-Female Phenomenon." In M.F. Blum and N. Blum (eds.), *Sexual Selection and Reproductive Competition in Insects.* New York: Academic Press.

Betzig, L.L. (1985). *Despotism and Differential Reproduction: A Darwinian View of History.* Hawthorne, NY: Aldine.

Betzig, L.L. (1988). "Mating and Parenting in Darwinian Perspective." In L.L. Betzig, M. Borgerhoff Mulder, and P. Turke (eds.), *Human Reproductive Behavior: A Darwinian Perspective*. Cambridge: Cambridge University Press.

Blurton Jones, N.G. et al. (1992). "Demography of the Hazda." *American Journal of Physical Anthropology* 89:159-81.

Bollen, K.A. (1980). "Issues in the Comparative Measurement of Political Democracy." *American Sociological Review* 45:370-90.

Bouthoul, G. (1968). "De Certains Complexes et de la Pyramide des Ages." *Guerre et Paix* 4:10-22.

Bouthoul, G. (1970). *Traite de Polemologie: Sociologie des guerres. Methodes. Doctrines et Opinions sur la Guerre.* Paris: Payot.

Bouthoul, G. and R. Carrere (1978). "A List of the 366 Major Armed Conflicts of the Period 1740-1974." *Peace Research* 10 (3):83-108.

Buss, D.M. (1987). "Sex Differences in Human Mate Selection Criteria: An Evolutionary Perspective." In C. Crawford, M. Smith, and D. Krebs (eds.), *Sociobiology and Psychology: Ideas, Issues and Applications.* Hillsdale, NJ: L. Erlbaum Associates.

Buss, D.M. (1989). "Sex Differences in Human Mate Preferences: Evolutionary Hypotheses Tested in 37 Cultures." *Behavioral and Brain Sciences* 12:1-14.

Chagnon, N.A. (1988). "Life Histories, Blood Revenge, and Warfare in a Tribal Population." *Science* 239:985-92.

Chagnon, N.A. (1990). "Reproductive and Somatic Conflicts of Interest in the Genesis of Violence and Warfare among Tribesmen." In J. Haas (ed.), *The Anthropology of War.* Cambridge: Cambridge University Press.

Choucri, N. and R.C. North (1975). *Nations in Conflict.* San Francisco: W.H. Freeman.

Colinvaux, P.A. (1980). *The Fates of Nations: A Biological Theory of History.* New York: Simon and Schuster.

Clarke, E. (1957). *My Mother Who Fathered Me.* London: Allen and Unwin.

Daly, M. and M. Wilson (1994). "Evolutionary Psychology of Male Violence." In J. Archer (ed.), *Male Violence*. London: Routledge.

Durham, W.H. (1979). *Scarcity and Survival in Central America: Ecological Origins of the Soccer War.* Stanford, CA: Stanford University Press.

Early, J.D. and J.F. Peters (1990). *The Population Dynamics of Mucajai Yanomama.* New York: Academic Press.

Ehrlich, P.R., A.H. Ehrlich, and J.P. Holden (1977). *Ecoscience: Population, Resources, Environment.* San Francisco, CA: W.H. Freeman.

Facts on File: World News Digest (1980-1998). New York: Facts on File, Inc.

Fix, A.G. (1977). *The Demography of the Semai Senoi.* Ann Arbor, MI: Museum of Anthropology.

Glossop, R.J. (1987). *Confronting War.* London: McFarlan and Company.

Grammer, K. (1989). "Human Courtship Behaviour: Biological Bases and Cognitive Processing." In A.E Rasa, C. Vogel, and E. Voland (eds.), *The Sociobiology of Sexual and Reproductive Strategies.* London: Chapman and Hall.

Hart, C.W.M. and A.R. Pilling (1960). *The Tiwi of North Australia.* New York: Holt, Rinehart and Winston.

Hill, K. and A.M. Hurtado (1996). *Ache Life History: The Ecology and Demography of a Foraging People.* New York: Aldine de Gruyter.

Homer-Dixon, T.F., J.H. Boutwell, and G.W. Rathjens (1993). "Environmental Change and Violent Conflict." *Scientific American* 268 (February):38-45.

Howell, N. (1979). *Demography of the Dobe !Kung.* New York: Academic Press.

Irons, W. (1983). "Human Female Reproductive Strategies." In S. Wasser (ed.), *Social Behavior of Female Vertebrates.* New York: Academic Press.

Kelly, R.C. (1977). *Etoro Social Structure.* Ann Arbor, MI: University of Michigan Press.

Kendall, M.G. and A. Stuart (1963). *The Advanced Theory of Statistics.* Vol. 1. New York: Hafner Publishing.

Kidron, M. and R. Segal (1995). *State of the World Atlas.* Fifth edition. London: Penguin Reference.

Krahn, H. et al. (1986). "Income Inequality and Homicide Rates." *Criminology* 24:269-95.

Leroy, M. (1978). *Population and World Politics: The Interrelationships between Demographic Factors and International Relations.* Leiden, Netherlands: M. Nijhoff Social Sciences Division.

Levy, J.S. (1983). *War in the Modern Great Power System, 1494-1975.* Lexington, KY: University Press of Kentucky.

Lockard, J.S. and R.M. Adams (1981). "Human Serial Polygyny: Demographic, Reproductive, Marital, and Divorce Data." *Ethology and Sociobiology* 2:177-86.

Low, B.S. (1990). "Occupational Status, Land Ownership, and Reproductive Behavior in the Nineteenth Century Sweden: Tuna Parish." *American Anthropologist* 92:115-26.

Low, B.S. (1993). "An Evolutionary Perspective on War." In W. Zimmerman and H. Jacobson (eds.), *Behavior, Culture, and Conflict in World Politics.* Ann Arbor, MI: University of Michigan Press.

Manson, J.H. and R.W. Wrangham (1991). "Intergroup Aggression in Chimpanzees and Humans." *Current Anthropology* 32:369-77.

McNeil, W.H. (1983). *The Pursuit of Power: Technology, Armed Force and Society since A.D. 1000.* Oxford: Basil Blackwell.

Mesquida, C.G. and N.I. Wiener (1996). "Human Collective Aggression: A Behavioral Ecology Perspective." *Ethology and Sociobiology* 17:247-62.

Miller, G.F. (1998). "How Mate Choice Shaped Human Nature: A Review of Sexual Selection and Human Evolution." In C. Crawford and D.L. Krebs (eds.), *Handbook of Evolutionary Psychology.* Mahwah, NJ: Lawrence Erlbaum Associates.

Mitchell, B.R. (1982). *International Historical Statistics: Africa and Asia.* New York: New York University Press.

Mitchell, B.R. (1983). *International Historical Statistics: The Americas and Australia.* London: Macmillan.

Mitchell, B.R. (1995). *International Historical Statistics: Africa, Asia and Oceania.* New York: Stockton Press.

Moller, H. (1967/68). "Youth as a Force in the Modern World." *Comparative Studies in Society and History* 10:237-60.

Moore, J.H. (1990). "The Reproductive Success of Cheyenne War Chiefs." *Current Anthropology* 31:322-30.

Murdock, G.P. (1949). *Social Structure.* New York: Macmillan Publishing.

Neel, J.V. and Chagnon N.A. (1968) "The Demography of Two Tribes of Primitive, Relatively Unaccultured American Indians." Proceedings of the National Academy of Sciences 59; 680-689.

Rappaport, R.A. (1967) Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People. New Haven, CT: Yale University Press.

Roberts, D.F. (1956). "A Demographic Study of a Dinka Village." *Human Biology* 28:323-49.

Sillitoe, P. (1977). "Land Shortage and War in New Guinea." *Ethnology* 16:71-81.

Singer, J.D. and M. Small (1972). *The Wages of War 1816-1965: A Statistical Handbook*. New York: John Wiley and Sons.

Sivard, R.L. (1988). *World Military and Social Expenditures.* Washington, DC: World Priorities.

Smith, M.G. (1962). *West Indian Family Structure.* Seattle, WA: University of Washington Press.

Sullivan, M.J. (1991). *Measuring Social Values: The Banding of 162 Countries.* New York: Greenwood Press.

Symons, D. (1979). *The Evolution of Human Sexuality.* New York: Oxford University Press.

Taylor, C.L. and M.C. Hudson (1972). *World Handbook of Political and Social Indicators.* New Haven, CT: Yale University Press.

Tooby, J. and L. Cosmides (1988). "The Evolution of War and Its Cognitive Foundations." *Institute for Evolutionary Studies, Technical Report #88-1.*

Townsend, J.M. (1989). "Mate Selection Criteria: A Pilot Study." *Ethology and Sociobiology* 10:241-53.
Trivers, R.L. (1972). "Parental Investment and Sexual Selection." In B. Campbell (ed.), *Sexual Selection and the Descent of Man.* Chicago: Aldine.
United Nations. *Demographic Yearbook 1965–1986.* New York: United Nations Publications.
United Nations. *Demographic Yearbook 1986*. New York: United Nations Publications.
United States Census Bureau: International Data Base (IDB) [online]. Available at http://www.census.gov/ftp/ipc/www/idbnew.html.
van der Dennen, J.M.G. (1995). *The Origin of War: The Evolution of Male-Coalitional Reproductive Strategy.* Groningen, Netherlands: Origin Press.
Vayda, A.P. (1976). *War in Ecological Perspective*. New York: Plenum Publishing.
Williams, G.C. (1966). *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought*. Princeton, NJ: Princeton University Press.
Wilson, M. and M. Daly (1985). "Competitiveness, Risk Taking, and Violence: The Young Male Syndrome." *Ethology and Sociobiology* 6:59-73.
Wright, Q. (1965). *A Study of War*. 2nd edition. Chicago: University of Chicago Press.