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Historical Trends in Great Power War, 1495-1975

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The hypothesis that war between the Great Powers is diminishing in frequency but increasing in seriousness is tested for the last five centuries of the modern Great Power system. We define this system, establish its origins in 1495, identify its membership, operationalize and identify its wars, measure these wars along several key dimensions, and analyze the historical trends along each dimension. It is found that the frequency of Great Power war has been diminishing rapidly from the sixteenth century to the nineteenth century, with a slight upturn in the twentieth century. The Great Power wars that do occur, however, have become more serious along every dimension except duration, which has remained unchanged. They have been increasing in extent (number of belligerent Powers), severity (battle-deaths), intensity (battle-deaths per capita), concentration (battle-deaths per nation-year of war), and, to a certain degree, magnitude (nation-years). These trends are explained in terms of technological innovation, increasing interdependence of the modern Great Power security system, increasing rationalization and centralization of military power under the state, popularization of war through the nation in arms, emergence of a peacetime military establishment directed by professionals, and total mobilization of society for the enhancement of the military power of the state.

It is widely believed that the probability of a war between the superpowers is diminishing but that its potential destructiveness is increasing. Our argument is that this phenomenon, if it exists, is not simply a product of the nuclear age but also a manifestation of long-term historical trends in war that have been underway for many centuries. While the future is a matter of conjecture, the question of past historical trends is eminently suitable for

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rigorous and systematic empirical research. The aim of this study is to test the hypothesis that war between the Great Powers has been decreasing in frequency but increasing in seriousness over the past several centuries.

These "Great Power wars" are of enormous importance for international politics. They have generally been history's most destructive conflicts and have had the greatest impact on the stability of the international system. For the most part, the interaction of the Great Powers determines the structure and evolution of the system and serves as the basis for most of our theories of international politics (Waltz, 1979; Levy, forthcoming). This question of historical trends in Great Power war is more than one of simple historical curiosity, however, for the occurrence of another Great Power war might very well bring an end to contemporary civilization. The Great Power wars of the past provide a rich source of historical data and in many respects provide the best empirical referents for a hypothetical super-power war of the future. While theory provides the best grounds for predictions about the future, in the absence of theory an empirically confirmed explanation of historical trends may be quite useful, particularly if the factors contributing toward the trend show no signs of abating.

Earlier studies of historical trends in war lend some support to our hypothesis but the evidence is fragmented and somewhat contradictory in nature. With respect to the frequency of war, Wright (1965: 638) and Beer (1981: 38-49) find a downward trend while Sorokin (1937: ch. 11), Richardson (1960: 136, 141, 167), Russett (1965: 13), Denton (1966), and Singer and Small (1972: ch. 8; Small and Singer, 1979) find no trend whatsoever. With respect to the destructiveness of war (conceived in terms of some measure of casualties), Sorokin (1937: ch. 11), Wright (1965: 121, 235-248, 638), Beer (1981: 38-49), Russett (1965: 12, 13), Denton (1966), and Richardson (1960: ch. 4) discover an upward trend, while Singer and Small (1972) find no trend.¹ The apparent

1. More precisely, Wright (1965: 638) finds a decline in the frequency of European wars but an increase in extra-European wars. Richardson (1960: 136, 141, 167) is ambiguous, particularly with respect to the frequency of war. Richardson concludes that while high-casualty wars are becoming more frequent and low-casualty wars less frequent (p. 147), casualties have not increased as rapidly as population (ch. 4).

inconsistencies in these studies derive from the fact that they cover varying temporal spans, examine different kinds of war (for example, interstate, imperial, and so on), refer to different dimensions of war, and use different operational indicators.

This study differs from earlier ones in several critical respects. First, we place an explicit focus on wars between the Great Powers. In spite of their importance, Great Power wars have received relatively little systematic attention. Many of the previous studies of historical trends focus on the more general phenomenon of war (Richardson, 1960; Russett, 1965; Denton, 1966) and make no effort to isolate the important class of wars involving the Great Powers. Singer and Small (1972) do identify a major power system but only for the post-1815 period. With less than ten cases, it is not possible to extrapolate with confidence from this period to a longer temporal span, particularly since the relative peacefulness of the first half of their period imposes an upward bias on inferred trends.² Nor are the more extended studies by Woods and Baltzly (1915), Sorokin (1937), or Wright (1965) very helpful in this regard. These are restricted to the major European states³ but generally include imperial wars and other wars with secondary states. There are also serious questions as to whether the states included in their studies really constitute a Great Power system.⁴ Furthermore, some states are included in these analyses during periods in which they had not yet risen to, or after they had fallen from, Great Power status. Consequently, these conclusions may not be applicable to the war behavior of the Great Powers *per se*.⁵

2. This probably accounts for their finding of the absence of any trend in the frequency of major power war.

3. Wright (1965) includes all European states but occasionally directs his attention to the Great Powers.

4. Sorokin (1937) for example, excludes Turkey, Sweden, the United States, and Japan from his analysis but includes Poland. In addition to the Austrian Hapsburgs, England, France, Holland, Prussia, Russia, Spain, Sweden, and Turkey, Woods and Baltzly (1915) also include Denmark and Poland. Wright (1965) includes Poland and Savoy as "important states."

5. The finding by Woods and Baltzly (1915), for example, that war is diminishing may simply reflect the lower level of war behavior of medium powers as compared to Great Powers, and the fact that many former Powers have left the system. Their data do show, in fact, a diminishing level of war only for states who could no longer claim Great Power status, whereas no such tendency is found for the continuing Great Powers. The utility of

This study also differs from earlier ones in terms of our extended temporal domain and more systematic data-generating procedures. The excellence of the Singer-Small (1972) war data is widely recognized but, as we have seen, the temporal domain is too restricted for the analysis of trends in Great Power war. The Woods and Baltzly (1915), Sorokin (1937), and Wright (1965) data-sets each cover at least five centuries, but their methodological procedures do raise some questions. Problems involving the identity of the Great Powers at any point in time were mentioned earlier. There is also some reason for concern regarding their data-generating procedures. The Sorokin and Woods-Baltzly criteria for inclusion and exclusion are far less explicit or systematic than those of Singer and Small, and Wright's legalistic criteria are open to question. These problems account for some major discrepancies between their compilations of wars (Levy, n.d.).

The absence of a systematic Great Power focus in earlier studies, in conjunction with the limited temporal span of some studies and the nonsystematic data-generation procedures of others, necessitates further research. Our aim is to focus on Great Power wars over the last five centuries and conduct a rigorous and systematic test for the existence of the hypothesized trends, determine their strength, and attempt to explain them.

Research Design

Our task requires the definition and identification of the powers and the modern Great Power system, specification of criteria for the identification of their wars, measurement of the wars along several key dimensions, and selection of appropriate methods of analysis given the question under consideration and the nature of the data.

the Woods and Baltzly study is further limited by the fact that their historical system ends in 1900, after the most peaceful century in modern history and just before two of the most destructive wars of all time.

THE MODERN GREAT POWER SYSTEM

A Great Power can be defined generally as a state which plays a major role in international politics with respect to security-related issues. Operational indicators of Great Power status include the following: possession of a high level of power capabilities, which provides for reasonable self-sufficiency in security matters and permits the conduct of offensive as well as defensive military operations; participation in international congresses and conferences; de facto identification as a Great Power by an international conference or organization; admission to a formal or informal organization of Powers; participation in Great Power guarantees, territorial compensation, or partitions; and, generally, treatment as a relative equal by other Great Powers (for example, protocol, alliances, negotiations, and so forth).⁶

The modern Great Power security system originated in early modern Europe and has gradually evolved into a truly global system.⁷ It is the late fifteenth century in general and 1495 in particular (formation of the League of Venice in response to the French invasion of Italy) that defines the origins of the system. This point marks the fusion of several distinct historical processes: the internal centralization of power within territorial states, the decline of the universal secular authority of the Pope and Holy Roman Emperor, the coalescence of the major territorial states of Europe into an interdependent system of power relations, and the emergence of a global world economy centered in Europe and sustained by sea power. This is consistent with a diverse body of literature on the origins of the modern system (Toynbee, 1954: ix, 237; Hill, 1914: Vol. 2, 209; Albrecht-Carrié, 1974: 1081-1082; Mattingly, 1955: 124-125; Oman, 1936: 16; Dehio, 1962: 23; Petrie, 1947: 1-2, 11; Mowat, 1928: 7, 28;

6. The element of circularity in some of these criteria is useful for the purposes of analysis. Certain states whose Great Power status is not in doubt (for example, Britain and France throughout much of the period) can be used as definitional "anchors" to aid in the identification of other members of the system through an iterative process.

7. This Eurocentric perspective does not deny the existence of other international systems (each with its own leading powers) prior to the modern European system or concomitant with but functioning independently of this system (Bozeman, 1960).

TABLE 1
The Modern Great Power System

France	1495-1975
England/Great Britain	1495-1975
Austrian Hapsburgs/Austria-Hungary	1495-1519; 1556-1918
Spain	1495-1519; 1556-1808
Ottoman Empire	1495-1699
United Hapsburgs	1519-1556
Netherlands	1609-1713
Sweden	1617-1721
Russia/Soviet Union	1721-1975
Prussia/Germany/West Germany	1740-1975
Italy	1861-1943
United States	1898-1975
Japan	1905-1945
China	1949-1975

Howard, 1976: 20; Wallerstein, 1976; Modelski, 1978). The theoretical criteria noted above are applied to the historical literature, and the resulting Great Power system is presented in Table 1.⁸

*GREAT POWER WAR: CONCEPTUALIZATION,
IDENTIFICATION, AND MEASUREMENT*

A Great Power war is an armed conflict between the organized military forces of two or more Great Powers, operationally defined as involving at least 1000 battle deaths, or an annual average of 1000, among the Powers (Singer and Small, 1972). Civil, imperial, and colonial wars do not satisfy the definition and are excluded.⁹ For the identification of wars prior to 1815, the Wright, Sorokin, and Woods and Baltzly data-sets are used, and

8. A more thorough discussion of the origins of the system, an analysis of the qualifications of each potential Great Power and its point of entry into and departure from the system, and a lengthy discussion of the various conceptual and methodological problems involved (particularly regarding the post-1945 system), can be found in Levy, (n.d. b).

9. Since we are dealing with a "closed" Great Power system (in terms of wars), we avoid the difficult analytical problem of differentiating between imperial wars and other wars between a Great Power and a weaker state. Note also that internationalized civil wars are included only if they involve the intervention of one Great Power in support of the insurgents opposed to an existing Great Power regime.

TABLE 2
Great Power Wars

<i>War</i>	<i>Dates</i> ^a
War of the League of Venice	1495-1497
Neapolitan War	1502-1504
War of the Holy League	1511-1514
Austro-Turkish War	1512-1519
Second Milanese War	1515-1515
First War of Charles V	1521-1526
Ottoman War	1521-1531
Second War of Charles V	1526-1529
Ottoman War	1532-1535
Third War of Charles V	1536-1538
Ottoman War	1537-1547
Fourth War of Charles V	1542-1544
Siege of Boulogne	1544-1546
Arundel's Rebellion	1549-1550
Ottoman War	1551-1556
Fifth War of Charles V	1552-1556
Austro-Turkish War	1556-1562
Franco-Spanish War	1556-1559
Scottish War	1559-1560 (1560)
Spanish-Turkish War	1559-1564
First Huguenot War	1562-1564
Austro-Turkish War	1565-1568
Spanish-Turkish War	1569-1580
Austro-Turkish War	1576-1583
War of the Armada	1585-1604
War of the Three Henries	1589-1598
Austro-Turkish War	1593-1606
Spanish-Turkish War	1610-1614
Spanish-Turkish War	1618-1619
Thirty Years War—Bohemian Period	1618-1625 (1621)
Thirty Years War—Danish Period	1625-1630
Thirty Years War—Swedish Period	1630-1635
Thirty Years War—Swedish-French Period	1635-1648
Franco-Spanish War	1648-1659
Anglo-Dutch Naval War	1652-1654
Great Northern War	1654-1660
English-Spanish War	1656-1659
Ottoman War	1657-1664 (1661)
Anglo-Dutch Naval War	1665-1667
Revolutionary War	1667-1668
Dutch War of Louis XIV	1672-1678
Ottoman War	1682-1699
Franco-Spanish War	1683-1684
War of the League of Augsburg	1688-1697

TABLE 2 (Continued)

<i>War</i>	<i>Dates</i> ^a
Second Northern War	1700-1721 (1715)
War of the Spanish Succession	1701-1713
War of the Quadruple Alliance	1718-1720
British-Spanish War	1726-1729
War of the Polish Succession	1733-1738
War of the Austrian Succession	1739-1748
Seven Years War	1755-1763
War of the Bavarian Succession	1778-1779
War of the American Revolution	1778-1784
French Revolutionary Wars	1792-1802
Napoleonic Wars	1803-1815
Crimean War	1854-1856
War of Italian Unification	1859-1859
Austro-Prussian War	1866-1866
Franco-Prussian War	1870-1871
World War I	1914-1918
Russian Civil War	1918-1921
Russo-Japanese War	1939-1939
World War II	1939-1945
Korean War	1950-1953

a. For wars which do not begin as Great Power wars, the date of intervention of the second Power is given in parentheses.

any Great Power war included in at least two of the three is included here. For the post-1815 period, the Singer-Small compilation is used with minor modifications based on our criteria. The resulting compilation of Great Power wars is given in Table 2.

In order to test the hypothesis that Great Power wars have become less frequent but more serious, we analyze war in terms of several key dimensions in addition to *frequency*. The *duration* of war refers to its total elapsed time (measured in years). The *extent* of war refers to the number of participating Great Powers. The *magnitude* of war, reflecting a joint spatial and temporal dimension and combining the extent and duration indicators, is the total nation-years of war for all participating Powers. The human destructiveness or *severity* of war is measured by the number of battle-connected deaths. Whereas the severity of war refers to loss of life in absolute terms, the *intensity* of war reflects the human destructiveness in relative terms and is the ratio of battle deaths to

European population.¹⁰ The *concentration* of war in space and time is another important dimension and is the ratio of battle deaths to nation-years of war. The 64 Great Powers wars since 1495 are measured along these dimensions using data from the Wright, Sorokin, and Singer-Small compilations. The data can be found in Levy (n.d.).¹¹

METHODS OF ANALYSIS

Several quantitative techniques are available for determining the historical trends in the war data. Here we shall use a combination of frequency counts and percentages, regression analysis, and rank-order correlation analysis. If we regress war indicator W_i against time (the year in which the war or period begins), the regression coefficient b (or slope) will measure the strength of the historical trend in terms of the average yearly

10. These dimensions are based on the Singer-Small conceptualization (1972: ch. 3), with some significant changes. Most important, because of the absence of population data for all of the Great Powers over the last five centuries, we use instead the aggregate population of Europe (in millions) as a benchmark for comparison for the intensity indicator. For a more extended discussion of these and related issues, see Levy (n.d. b).

11. It will be noted that both the definition of Great Power war and its operational indicators have been defined as invariant over time. In spite of technological innovation and the emergence of nationalism, the modern bureaucratic state, professional military establishments, and the mobilization of entire societies for war, we are still dealing with armed conflict between the organized military forces of the four to eight dominant states in the system for the general purpose of advancing state interests (or at least those of the ruling elite). The Italian wars of the late fifteenth and early sixteenth centuries appear to be, at least in their diplomatic respects, fundamentally similar to the Crimean War or World War I four centuries later (and probably no less concerned with "state" interests as compared with internal politics). The battle-death criterion may raise potential problems, for the relative impact of 1000 battle deaths today is far different from that five centuries ago. However, this is most critical for wars of relatively low severity, the number of which are minimized by our focus on Great Power war. Nor is it clear that organized military conflicts involving fewer than 1000 casualties were necessarily more common in the early years of the system. A minimum intensity (battle deaths relative to population) could be used, but severity and intensity are correlated (r) at .997. Furthermore, the only way to determine whether war has in fact changed is to use a fixed standard or single indicator and measure empirically its changes over time; otherwise actual substantive changes may be simply defined away by a variable measuring instrument. The explanation of changes in war requires that the measurement of war be strictly independent of that of the explanatory variables.

change in W_i . In order to compare the relative magnitude of the trends in two different indicators, the standardized regression coefficients (b^*) can be compared.

There is a problem if the linear regression model is applied to the fatality-based indicators. The least-squares criterion gives disproportionate influence to extreme cases, with the result that, for our study, the two World Wars would have a disproportionate impact on the trend lines. In order to eliminate this effect deriving from the method of analysis itself (rather than the true importance of the wars), two alternative methods are employed. First, the rank-order correlation coefficients (τ - b) between each indicator and time are provided; these measure whether war indicator W_i is increasing over time, but incorporate no information regarding the amount of these increases. Secondly, the logarithms of the severity, intensity, and concentration indicators are regressed against time. These will reveal the same positive or negative trends as for the regular regressions (since a logarithmic transformation is a monotonically increasing function) but the interpretation is equivalent. Since this technique is equivalent to running an exponential curve throughout the raw data, the beta coefficient is equivalent to the percentage increase in the war indicator per unit change in time (Wonnacott and Wonnacott, 1981: 120-124; Tufte, 1974: 124-128). Given beta, we can also calculate the doubling time of any indicator.¹² Another advantage of both logarithms and rank-order correlations is that they are less sensitive to measurement errors in the data. The latter require only ordinal-level precision, a requirement basically met even by the fatality-based indicators for the pre-1815 period. The use of these multiple methods of analysis will minimize the possibility that our conclusions will be determined by the idiosyncracies of particular techniques.¹³

12. Actually, since we are using common logarithms, the percentage change in the war indicator, or growth rate, is given by $r = \beta / \log_{10}(e)$, or 2.3 β . The doubling time is then $.69/r$.

13. One word regarding potential problems of autocorrelation or heteroscedasticity in the regression analysis. An examination of the scattergrams shows that several of the indicators, and particularly the severity-based ones, are heteroscedastic, generally with increasing variances over time. Also, a Durbin-Watson test for serial correlation reveals autocorrelation in the duration and possibly the magnitude indicators, but in none of the

*Analysis of the War Data**FREQUENCY OF
GREAT POWER WAR*

Our first question is whether Great Power wars are becoming more or less frequent over time. There is little doubt about the answer, as seen from Figure 1 which plots the frequency of Great Power war per quarter-century against time, and from Table 3, which computes the average frequency of war per decade for each century. There has been a continuous decline in the number of Great Power wars in each century from the sixteenth to the nineteenth, with a very slight increase in the twentieth century. Over 75% of the Great Power wars occur in the first half of the 480-year system (prior to 1735), while less than 25% occur in the last 240 years. An examination of the data based on a five-year period of aggregation demonstrates that only 25% of the half-decades since 1815 have witnessed the initiation of Great Power war, compared to nearly 60% in the previous three centuries. The relative absence of Great Power war in the nineteenth century (except for the 1850-1875 period) is quite striking, particularly in contrast with the relatively high frequency of Great Power war in earlier periods (ranging up to nine in one 25-year period in the sixteenth century). The average frequency of Great Power war in the twentieth century is only a fourth of its average frequency in the sixteenth century.

The strength of this downward trend is confirmed by a correlation and regression analysis. The rank-order correlation between time and frequency of war per five-year period gives $\tau_b = -.36$ (the corresponding statistics for 10- and 25-year periods are $-.44$ and $-.61$). The rate of decline can be measured by a linear

others. These problems of heteroscedasticity and autocorrelation would *not* result in biased estimators of the population regression coefficient (which is our main concern), but they would result in an underestimation of the variance of and reduction in the efficiency of the estimator (Johnston, 1972: 214-221, 246-249; Goldberger, 1964: 238-241; Yamane, 1973: 1000). Here, however, we are using the least-squares method only to describe a trend in an existing set of data. We are dealing with the universe rather than a sample, so there is no need to estimate population parameters. Problems of heteroscedasticity and autocorrelation therefore do not really affect this analysis. Furthermore, they have no impact on the rank-order correlations which we use to supplement the regression analysis.

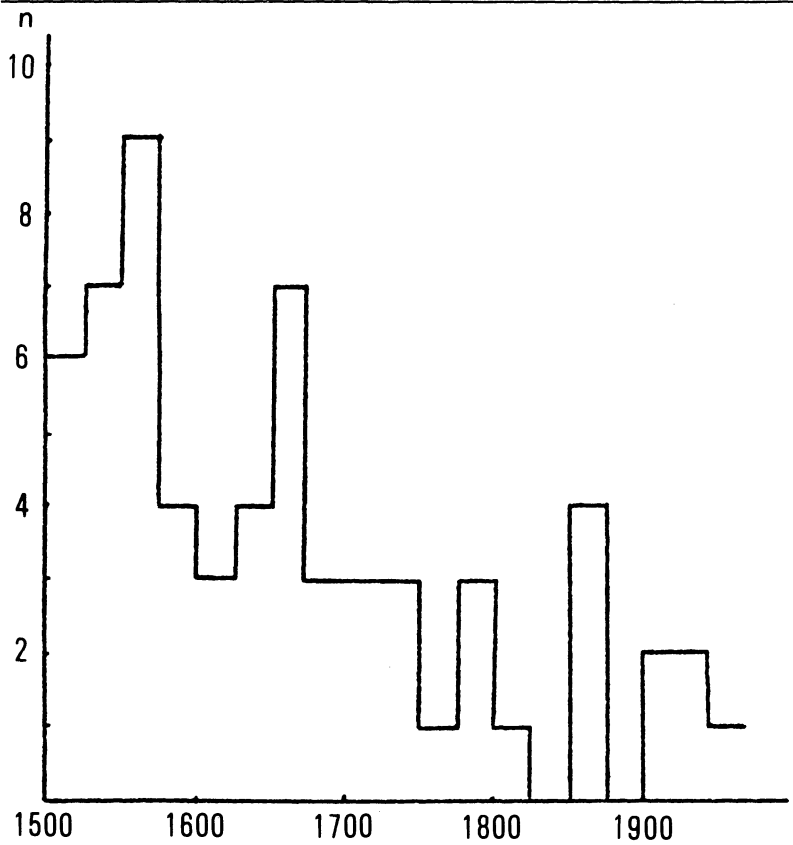


Figure 1: Frequency of Great Power War, 25-Year Intervals

TABLE 3
Average Frequency of Great Power War per Decade
for Each Century

<i>Century</i>	<i>Average Frequency per Decade</i>
16th	2.6
17th	1.7
18th	1.0
19th	.50
20th	.66

TABLE 4
The Changing Characteristics of Great Power War:
Regressions and Rank-Order Correlations with Time

<i>Dimension</i>	<i>Tau-b</i>	<i>b</i>	<i>b*</i>
Duration	.02	-.0022	-.06
Extent	.32	.0058	.48
Magnitude	.14	.022	.18
Severity	.27	.0027	.40
Intensity	.20	.0020	.31
Concentration	.36	.0029	.57

NOTE: The unstandardized and standardized regression coefficients (*b* and *b**) for the severity, intensity, and concentration indicators are from the regressions of the logged values of the indicators against time. The significance levels for the *b*s are, respectively, .6, .000, .16, .001, and .000.

regression analysis. Regressing frequency against time (using one-year periods), we get a *b* of -.00053 and a *b** of -.20 (statistically significant at .000). This means that the number of wars per year has been declining by .00053 each year (or .25 wars per year over the last five centuries). In other words, the average decade today is characterized by 2.5 Great Power wars less than the average decade 480 years ago (which is roughly consistent with Table 3). This decline is quite significant substantively, given that it is roughly two times the average frequency of Great Power war per decade for the entire period (1.3). It should be noted from Figure 1 that this trend was underway long before the twentieth century and the development of modern military technology.

THE CHARACTERISTICS OF GREAT POWER WAR

Having established that Great Power war has been declining in frequency, let us now ask our second question: Given that a Great Power war occurs, is it getting more or less serious in terms of the dimensions of duration, extent, magnitude, severity, intensity, and concentration? Each of the war indicators is regressed against time and the rank-order correlations are determined. The results are presented in Table 4. The tau-*b*'s and regression coefficients in Table 4 indicate that over the last five centuries Great Power wars

have become increasingly serious in every respect but duration. While the *duration* of Great Power wars has remained basically constant since the late fifteenth century, the *extent* of Great Power wars has increased sharply. The b of .0058 indicates that the number of Powers participating in Great Power war has been increasing by approximately .006 per year (regardless of whether a war actually occurs) or by over one Power every two centuries. The significance of this is evident when one considers that the average number of Powers participating in a single Great Power war is only 3.2 (and the median only 2.5). In more substantive terms, an analysis of the data scattergram would suggest the following: Prior to the Thirty Years War, no conflict involved more than four Powers and most wars involved two Powers;¹⁴ from the early seventeenth century to the early nineteenth century, the number of warring Powers varied from one to six, the median being four; no war in the nineteenth century involved more than three Powers, but the two World Wars in the twentieth century involved seven and eight Powers, respectively. Furthermore, the proportion of Great Power wars which involve a large number of Powers is much higher in recent times than previously. Since Vienna, for example, two-thirds of these wars have involved three or more Powers, whereas previously this ratio was less than half. Thus the proportion of conflicts which expand into larger wars involving several Powers has been increasing over time.¹⁵

The *magnitude* of Great Power war has also been increasing but less than half as fast as its extent (as indicated by the b^* of .18 compared to .48 for extent). The b of .022 suggests that the magnitude of war has been increasing by over two nation-years each century (compared to a mean of 16, median of 11). This is not statistically significant, however ($p = .16$), given the large

14. Recall here that, from 1519 to 1556, the Hapsburg dynasty under Charles V is defined as a single unified Great Power.

15. These trends are not simply a function of the number of Powers in the system at any point in time. While the system has been increasing in size ($b = .003$ for a regression of the number of Powers in the system against time, using one-year intervals), none of our war indicators is even moderately associated with the number of Powers in the system. The maximum correlation between the size of system and any of the indicators of the amount of war underway in a given year is $r = .18$.

variance in magnitude. Great Power wars have also become increasingly destructive in terms of all of the fatality-based indicators, as demonstrated by the tau-b and regression coefficients.

The *severity* of Great Power war has been increasing at an average rate of .62% each year. At this rate, the average number of battle deaths in a Great Power war has doubled every 110 years or so. The *intensity* of war has increased nearly as rapidly (.46% per year), doubling every 150 years. The most pronounced trend in Great Power war, as indicated by the b^* of .57, is its increasing *concentration* over time. The number of battle deaths has increased at a rate of .67% per year, doubling every 100 years. An examination of the scattergrams of the data would clearly reveal that these upward trends are not simply the product of the enormous destructiveness of two World Wars, but would hold true without them.

Interpretation of the Historical Trends

The preceding data analysis leaves little doubt regarding historical changes in wars between the Great Powers over the last five hundred years. Great Power wars have been rapidly diminishing in frequency but increasing in extent, severity, intensity, concentration, and (to a certain degree) magnitude. That is, Great Power wars have involved an increasing number of belligerent Powers, and nation-years of war, and have become increasingly violent in terms of absolute and per capita battle deaths and their relative number per nation-year of war. Of the important dimensions of Great Power war defined here, only its frequency has diminished and only its duration has been relatively constant over time. The hypothesis that Great Power wars have become less frequent but more serious or destructive is confirmed beyond any reasonable doubt.

The description of historical trends is easier than their explanation, however. Before it could be fully accepted, such an explanation would itself have to be tested against the historical evidence. This would require the operationalization and measure-

ment of the explanatory variables (and plausible control variables as well) in as systematic a manner as we have dealt with the dependent variable. This is an enormous task lying far beyond the scope of this study. Having rigorously and systematically described longitudinal trends in Great Power wars, we can here only hypothesize about their theoretical explanations, by identifying the important variables and suggesting plausible theoretical linkages.

Of all the trends, perhaps most puzzling is the relatively unchanging duration of Great Power war. We might have expected that improvements in communications and logistics would have increased the speed of military operations on the battlefield and that innovations in military technology and the increasing destructiveness of military conflict would have increased the costs of war; both would presumably force an earlier termination of the hostilities. Obviously, there are other variables which counteract this tendency.¹⁶ While the costs of war have become much greater, the gradual industrialization of basically agricultural societies has increased their economic capacity to sustain a war and accept the costs. We might also hypothesize that, in spite of the enormous changes in military technology, the defense has managed to keep up with the offense, so that it takes equally long to obtain a decisive advantage on the battlefield.¹⁷ Finally, the increasing organizational momentum and incrementalism generated by a larger and more firmly entrenched bureaucracy, and the increasing political insecurity of elites (deriving from the decline of dynastic legitimacy) in conjunction with increasing nationalist pressures, both make it ever more difficult to withdraw from a costly but inconclusive war (Iklé, 1971).

Equally interesting is the fact that an ever-increasing number (and proportion) of Great Powers have been participating in these wars. We might hypothesize that this derives in part from the increasing interdependence of the modern Great Power

16. If it were true that the duration of a war were inversely related to its costs, we would expect a strong negative correlation between duration and concentration. The tau-b of .07 suggests the absence of any significant relationship.

17. Wright (1965, pp. 1519-1520) argues that military invention has in the long run tended to benefit the defensive more than the offensive. This would generate a stalemate and thus predict wars of increasing duration. Wright is not always consistent on this point, however (see p. 292).

security system. As the Great Powers evolved from dynastic to nation-states, their "national interests," as well as their capabilities to project power in defense of their interests, tended to expand and their commercial relationships also became closer. The Great Powers came increasingly to perceive their own strategic and economic interests as dependent on power relationships in the system as a whole, and were increasingly likely to intervene in external wars to maintain a "balance of power" or their own influence and prestige. Hence the extent (and also the magnitude) of Great Power war has increased over time.¹⁸

Let us now consider the increasing destructiveness of war in terms of severity, intensity, and concentration. The most obvious explanation, of course, is *technological*: the major changes not only in the destructive power of weapons, but also in their range, accuracy, volume of fire, mobility, and penetrability, and the speed and efficiency of military transport and communications systems. In addition, there has been an increasing economic capacity to produce a larger quantity of weapons and support systems. Much of the increased capacity for violence over the past centuries can be traced to the changes in production and transport generated by the industrial revolution (Millis, 1956: ch. 2; Fuller, 1961: ch. 5); the mechanization of war at the beginning of the twentieth century (Millis, 1954: ch. 4; Osgood, 1967); the development of airpower a few decades later; and (in terms of potential destruction for the future) the development of nuclear weapons and global delivery systems by the second half of this century.

Technological innovation alone, however, cannot fully explain the increasing destructiveness of Great Power wars in the last five centuries. There are several interrelated political, socioeconomic, and cultural factors contributing to the gradual emergence of total war. Let us briefly consider these in approximate chronological sequence.¹⁹ First was the increasing *rationalization* of

18. Note that this argument in some ways contradicts the classical liberal notion that economic interdependence is the best guarantee of peace (Silberner, 1946). The emphasis here, however, is on the interdependence of the security system rather than the economic system.

19. This conceptualization generally follows and attempts to build upon that of Osgood (1967).

military power under the state, beginning in the late fifteenth century and intensifying after the legal codification of the existing sovereign state system at Westphalia.²⁰ The wars for the personal honor, vengeance, and enrichment of kings and nobles in Middle Ages (which may have contributed to their frequent but limited nature) were increasingly replaced by the “rational” use of force as an efficient instrument of policy for the achievement of political objectives, first by dynastic/territorial political systems and ultimately by nation-states. The seriousness of the wars grew proportionally with the expansion of these political objectives, from personal gain, to the territorial aggrandizement of the state, to the national ambitions of an entire people.

Reinforcing this was the increasing *centralization* of political power within the state (Osgood, 1967). This began with the gradual subordination of feudal interests to centralized state authority in the early sixteenth century, and intensified in the late seventeenth century with the development of an administrative and financial system capable of supporting a military establishment and providing the logistical basis for an expanded military effort (Osgood, 1967).

Contributing further to the power of states and their ability to make war was the *commercialization* of war beginning in the early seventeenth century. There was an increasingly symbiotic relationship between the state and the commercial classes. Commerce generated the wealth necessary to sustain war (Blainey, 1973, ch. 6) and war in turn became a means of expanding commerce. In the mercantilist conception, commerce was a continuation of war (with an admixture of other means) and war was a continuation of commerce (Howard, 1976: 47). The merchants' enthusiasm for war diminished somewhat as this mercantilist system was replaced by free trade in the late eighteenth century,

20. Osgood (1967) suggests that the rationalization of force does not begin until the eighteenth century. This minimizes the importance of the use of force as a political instrument by territorial states prior to the religious wars (1560-1648). After all, it was in the early sixteenth century that Machiavelli's *Prince* expounded on the principles of *realpolitik*. In addition, the use of the “national interest” criterion to exclude this earlier period minimizes the continued importance of personal and other nonnational interests in more recent times.

but the link was hardly broken and subsequent economic progress contributed further to the state's capacity for war.

This period also marked the emerging *popularization* of war: the rise of nationalism and popular ideology, the institution of conscripted manpower, and the creation of the "nation in arms" (Osgood, 1967; Millis, 1956: ch. 1; Preston and Wise, 1979: ch. 12). Each of these phenomena contributed to the enhancement of the military power of the state.

The state's ability to utilize these expanding resources was furthered by the *professionalization* of military power in the late nineteenth century (Osgood, 1967; Millis, 1956: ch. 3; Huntington, 1957: pt. I). This refers to the development of a peacetime military establishment directed by a new professional military elite that was independent of the aristocracy, headed by a general staff system, run according to new principles of scientific management, and supported by a system of military academies. These developments not only increased the efficiency of the conduct of war; they also enhanced the legitimacy of the military profession and contributed to the trends towards militarism, the acceptance of the values of the military subculture as the dominant values of society (Howard, 1976: 109-110; Vagts, 1959). At the same time, the earlier moral and cultural restraints on war associated with the Christian and Humanist traditions were gradually eroded by the materialism and individualism of industrial society (Nef, 1968).

These trends culminated in World War II with what Millis (1956) calls the *scientific revolution* in war: the harnessing, for the first time, of the entire scientific, engineering, and technological capacities of the nation directly for the conduct of the war. This mobilization of the intellectual as well as material and social resources of the nation for the purposes of enhancing military power continues now in peacetime. These political, social and cultural developments, in conjunction with technological innovation, have been largely responsible for the increasing destructiveness of war.

Let us consider some plausible explanations for the declining frequency of Great Power war. It can generally be argued that the

potential benefits of Great Power war have not kept up with their rising human and economic costs. Warfare has involved enormous increases in casualties and human suffering, the physical destruction of industrial infrastructure, and opportunity costs for society deriving from increasing costs of weapons systems, manpower, and logistics. The greater tendency toward external intervention in Great Power war (described above) further raises the costs or reduces the potential benefits from war, whether by adding the military burden of an additional enemy or by necessitating the sharing of the gains with an ally. The declining legitimacy of Great Power war (Knorr, 1966) has increased its diplomatic and domestic political costs. Finally, the changing bases of national power and the declining value of territorial conquest (Knorr, 1966) have reduced the potential benefits of Great Power war, as has the increasing congruence between state and ethnic boundaries (at least for the Great Powers). These increasing costs of Great Power war relative to its perceived benefits have reduced its utility as a rational instrument of state policy and largely account for its declining frequency.²¹

As noted earlier, these statements should be interpreted as hypotheses to be tested rather than empirically confirmed theoretical generalizations. The existing literature on the evolution of war provides an ample reservoir of information from which data can be extracted to test these hypotheses (in addition to the sources cited above, see Ropp, 1962; Montross, 1960; Brodie and Brodie, 1973; Fuller, 1945, 1954; Vagts, 1959; Wright, 1965). It should be recognized, however, that such a task would involve some very difficult analytical and methodological problems.

21. Since the frequency of Great Power war has declined but its extent has increased, I have hypothesized that (1) the initiation of Great Power war has become less rational (in terms of perceived benefits relative to costs) *and* that (2) intervention in an ongoing war between Great Powers has become more rational (at least in the prenuclear age). These hypotheses are consistent if the structure of threats and opportunities is sufficiently asymmetric to ensure that the incentive to maintain the status quo is far greater than the incentive for change in one's favor.

Conclusion

We have established empirically that, over the last five centuries, wars between the Great Powers have become less frequent but more serious in terms of their extent, severity, intensity, concentration, and (to a certain degree) magnitude. We have also suggested some hypotheses to account for these trends, but these hypotheses have yet to be empirically confirmed. The "big" question of course, is whether there will be Great Power wars in the future, and if so, what will they be like? An extrapolation from past historical trends into the future would provide one possible answer to this question. Prediction in international relations presents major problems, however (Singer, 1973; Choucri and Robinson, 1978), particularly in the absence of an empirically confirmed explanation of past trends, and in an age in which the international system has undergone some fundamental transformations. What is ultimately necessary for prediction is a *theory* of the causes and escalation of Great Power war and an analysis of how each of the variables and interrelationships of the theory has been affected by recent transformations of the international system. In this way we could generate a theory of Great Power war in the nuclear age, and therefore a basis for making predictions about the future.

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