System Structure and Violent Conflict

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ABSTRACT

This paper performs a series of tests on the role of system structure in determining the prevalence of warfare in a state system. System structure is conceived of and operationalized as polarity as opposed to previous studies that use the simple number of major states or a power concentration index. The paper compares three separate state systems: the Chinese system from 725 BC to 1850 AD, the Indic (or South Asian) state system from 500 AD to 1800 AD, and the European system from 1494 to 1985. It uses Wilkinson's system structure data for the Chinese and Indic state systems. The paper develops a new, 4-component measure of power for the major countries in the European state system from 1494 to 1945 and from that calculates the polarity or structure of the European state system for that time frame. The paper compares the relative frequency of warfare for each system type in the different state systems. It finds that in the European system bipolarity has the best track record in terms of experiencing less violent conflict. The pacifying effect remains even if one does not include the post-1945 era. If one looks at all three state systems, tripolarity is the only system type with a pacifying effect.

INTRODUCTION

One of the core tenets of the neorealist school of thought is that the structure of an international system has a profound effect on the stability of that system in terms of the crises, violence, and warfare that occurs. Unfortunately (and somewhat curiously), the questions of whether that tenet is true and, if so, in what manner the structure affects the level of conflict remain unanswered (Lebow, 1995). On the theoretical side, an exploration of different arguments regarding the warfare-dampening effects of alternative system structures reveals positions in favor of most if not all of the different types. One can find advocates of unipolar (hegemonic) systems, bipolar systems, tripolar systems, and multipolar systems. There are even a variety of arguments about the peace-enhancing impact of multipolar systems of different sizes.

If we start from unipolarity, we can find proponents such as Gilpin (1981), Keohane (1980), and Organski (1958). The core of their arguments is that a dominant (hegemonic) country has an interest in and the capability to keep the peace. Violence happens when the dominance withers and the country can be challenged by others whose goals and satisfaction with the current state of affairs differs from that of the dominant country.

Bipolarity, of course, has Waltz (1979) as a champion. The virtue of bipolarity rests on two assertions. First, uncertainty, especially regarding the opponent and the

opponent's capabilities, is smaller than in tripolar or multipolar systems. Second, the perceived high cost of a miscalculation or allowing a situation to get out of hand makes the two powers inherently cautious. A third point can be made that with two powers we avoid the potential situation of a unipolar system where one country can act unchecked. Arguments against bipolarity, conversely, focus on the inherent instability of a situation with frequent crises and confrontations because of two powers intent on not letting the other get an advantage (Spanier, 1975).

Tripolarity finds supporters in Ostrom and Aldrich (1978), who argue it is the optimal system, and (indirectly) Gulick (1955) and Hoffman (1965). The fundamental argument in favor of tripolarity is that in a tripolar system there will be a tendency for the two weaker powers to form a coalition to deter actions by the most powerful country, yet a coalition is unlikely to be aggressive because collectives tend to be conservative in their actions (Caplow, 1968). Interestingly, tripolarity also has explicit detractors such as Waltz (1979) and Kaplan (1957). The argument against tripolarity is that there is a high probability that two of the powers will gang up on the third, an interesting argument given Caplow's assertions from triad theory.

Multipolarity garners support from many scholars such as Morgenthau (1967), Singer and Deutsch (1964), Burns (1961), and Wright (1965). There are two main arguments in favor of multipolarity. The first is that having a larger number of major powers creates more opportunities for power balancing to occur through coalition or alliance formation. The second reason is that the heightened uncertainty resulting from the greater complexity of more possible coalitions instills increased caution in the countries and their interactions.

More generally, but especially with respect to multipolarity, we find the following contentions about the relationship between system stability and the number of states:

- stability increases with the achievement of multipolarity, but there is no specified form for how stability changes as the number of states increases
- stability increases as a linear function of the number of states
- stability increases as a second-order function of the number of states
- stability is enhanced with the achievement of a minimum of five states with stability particularly increasing through having even larger odd-numbered sets of states.

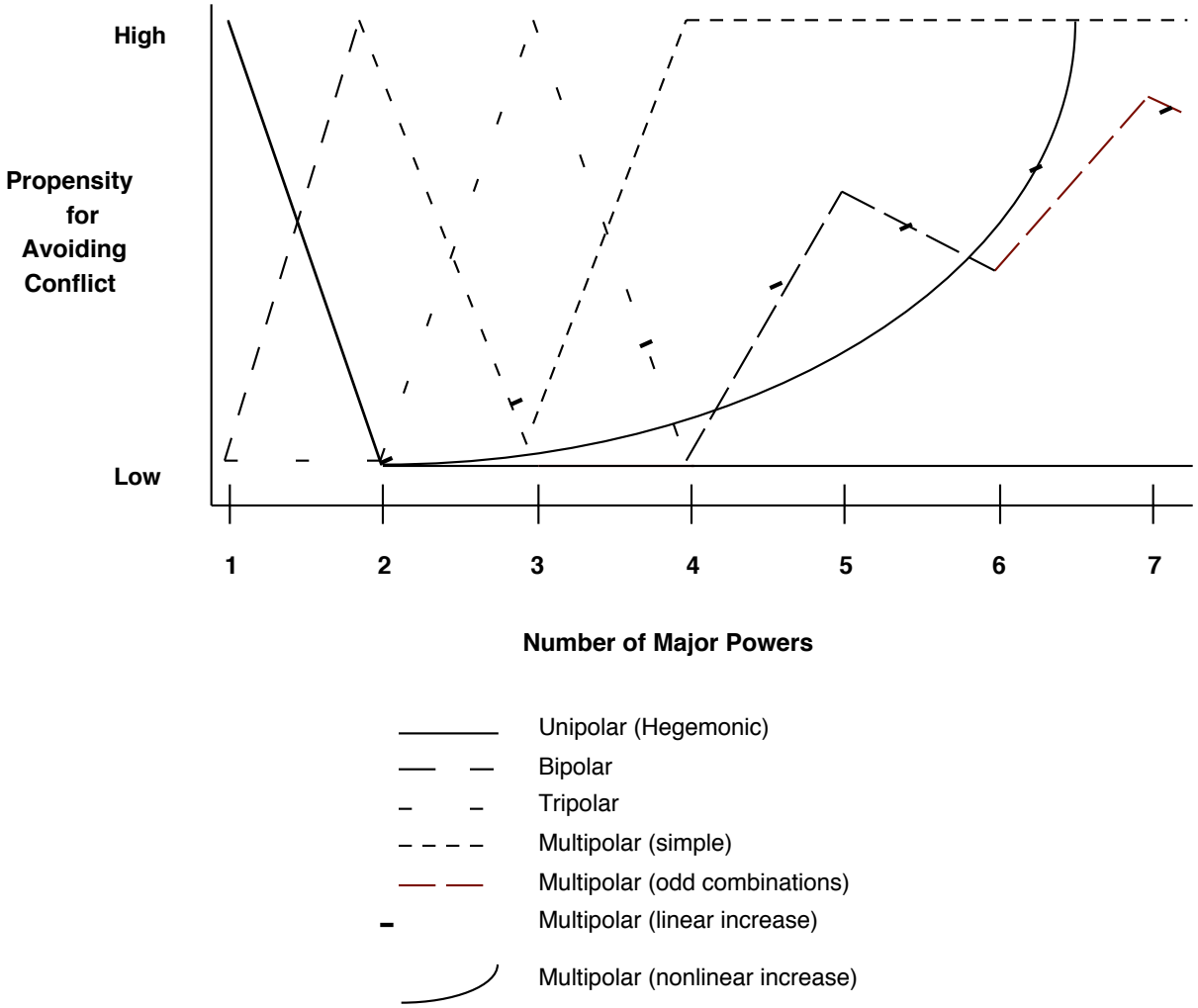
Levy (1984) nicely summarizes these arguments.

Figure 1 depicts seven different positions in a *very* schematic form. Each line portrays how an international system with differing numbers of major powers or different types of polarity is likely to fare in terms of preventing or avoiding violent conflict according to the advocates of a particular structure. The unipolar (hegemonic), bipolar, and tripolar lines are fairly straightforward. The line peaks at the appropriate number of powers and declines sharply away from that peak. The four variants of multipolarity presented

need more elaboration. The simple variant of multipolarity attempts to capture the argument that peace enhancement rises markedly as the system becomes multipolar. The linear increase variant of multipolarity portrays the alternative position that peace enhancement smoothly increases with the number of major powers. The odd combinations variant delineates the more complex argument that, beginning with five powers, increasing multipolarity increases peace enhancement, but the effect is much stronger when there are an odd number of major powers. The nonlinear variant attempts to depict the argument that the stabilizing or pacifying effect of multipolarity increases at an increasing rate as the number of powers goes up.

Figure 1

Alternative Predictions Relating System Structure to Conflict in System



One could say that, at least theoretically, the bases are covered. If there is evidence showing one type of system structure or another having experienced fewer conflicts than the others, there already exists a theoretical explanation.

Unfortunately, a subsequent search for evidence in favor of one or more of the alternatives unearthed a surprizing, even dismaying, dearth of studies that truly address the question of system structure and violent conflict. This assessment results from three elements of previous efforts.

The first way in which the question has not been directly addressed is that the studies examine the relationship between violent conflict and something related to but not the same as system structure. Levy (1984) relates the number of major states to warfare, but the simple number of states does not take into account the distribution of power among the states, which is clearly a key component of system structure as most people conceive of terms such as bipolarity. Others (Singer, Bremer, and Stuckey,1972; Wayman, 1984; Mansfield, 1992) relate one or more measures of power concentration to warfare. However, analysis done by the author as part of this paper found that there is not a good correlation between measures of power concentration such as found in those three articles and system structure categories such as bipolarity and tripolarity used in this paper.

The second way in which the question of system structure and violent conflict has not been directly addressed is that the studies employ a measure of power for determining system structure that is too narrow. Thompson (1986), for example, uses a measure of power based solely on major naval combat vessels. Yet such a measure skews the results against countries that do not have large navies yet may be powerful in other ways such as possessing potent armies.

The third way in which the question has not been adequately address is that the time frames used in the studies are not sufficiently long to have a significant number of years for each system type or even to encompass all of the system types (Midlarsky, 1974; Spezio, 1990; Hopf, 1991; Schweller, 1993). A short time frame also leaves open the question of whether system type is the explanatory variable or is there something else that overlaps for the short period of time that is the true explanatory variable.

At least part of the problem is available data. Sources exist containing the information to quite thoroughly address the violent conflict side of the relationship, although the conflict data for the Indian subcontinent was not in a readily useable form. The other component, system structure information, has been a different matter. Wilkinson has produced time series of system structure for the Far Eastern (Chinese) state system from 1025 BC to 1850 AD and for the Indic (Indian subcontinent) state system from 550 BC to 1800 AD (Wilkinson, 1999b and 1996, respectively). These series are

invaluable because they (at least in principle) allow an empirical test that includes a comparison of three distinct state systems: European, Chinese, and Indian.

The unexpected hurdle to such a three-way comparison is that with respect to the European state system, there is disagreement or at least confusion as to what was the nature of the system at any given time. For example, Waltz's (1979) characterization of the system being multipolar from 1700 up until 1945 when it became bipolar does not easily reconcile with Gilpin's (1981) assertion that Britain exercised hegemony from 1815 to 1914 and then the United States exercised hegemony after 1945. At minimum they are talking about different systems. Most certainly there is no agreed-upon time series of Europe's system structure.

Consequently, even though it was certainly not anticipated when this project started, a major effort of the project became making such a time series as well as creating a consolidated list of South Asian conflicts.

The thread of the paper thus runs as follows. Following a discussion of methodological issues, the paper describes the data that was generated to make the cross-system, empirical test of system structure, and then uses the data to make that test. More specifically, it describes the creation of a 4-component power index for the major powers of the European state system from 1494 to 1945 and the transformation of those countries' power scores into a determination of the polarity of the European state system over that time frame. More briefly it describes the creation of the list of Indic conflicts. The paper then conducts an analysis using the three state systems of the relative amount of warfare experienced by each system type. The paper concludes with an assessment of whether a system's structure is indeed an important determinant of the amount of violent conflict within a system, and if so, the nature of the system structure's influence.

METHODS FOR DETERMINING SYSTEM STRUCTURE

When one studies those works that empirically test whether there is a relationship between system structure and warfare, one finds that researchers tackle the challenge of how to capture and depict system structure through one of three routes. The first route, argued for most forcefully by Levy (1984), uses system size, the simple number of major states, to represent the system's polarity. Using that path results in the European system being effectively treated as multipolar from 1495 to 1975 (in his article) with the lowest level of "polarity" being quadrapolar. Such a decision rule means that the relative merits of unipolarity, bipolarity, and even tripolarity are not tested. More troubling is that the distribution of power capabilities among the major states is not taken into account.

The second and third routes start from that criticism. It is not simply the number of

major states that matters. Rather, the distribution of power or capabilities within the system, especially among the major states, serves as a better measure of the polarity of a system because it gets at differences that are likely to be behaviorally important, a point cogently argued by both Thompson (1986) and Mansfield (1993). As Thompson puts it, "...is it plausible to entertain precisely the same behavioral expectations for a five-power system in which two of the five actors control 80% of the capabilities and for a five-power system in which each actor controls exactly 20% of the capabilities?" (p. 594).

Where the second and third routes part company is in how they try to operationalize the distribution of capabilities. The second route has been taken by Singer, Bremer, and Stuckey (1972), Mansfield (1993), and others. These studies generate and use indices of power concentration. The indices reduce a configuration of country power shares into a single number. Singer, Bremer, and Stuckey employ a measure of concentration formally presented in Ray and Singer (1973). Mansfield argues for and uses a different measure that has been developed by economists. Rasler and Thompson (1994) use the Ray-Singer power concentration index as well as a leadershare index. However, the leadershare index measures only the power share held by the leading country and thus does not fully measure power distribution. Indices, while they may adequately capture the notion of power concentration, they to differing degrees capture power distribution (Mansfield, 1993) and, more importantly, do not clearly relate to polarity categories such as bipolarity.

The third route has been taken by Thompson (1986) and this paper. This route uses a set of decision rules to convert the distribution of country power shares into polarity categories. Thompson proposes the following definitions of different categories of polarity:

1) In a unipolar system, one state controls 50% or more of the relative capabilities that matter

2) In a near-unipolar system, one state controls more than 45% but less than 50% of the relative capabilities and no other state possesses as much as 25%

3) In a bipolar system, two states control at least 50% of the relative capabilities and each of the two leading actors possess at least 25% with no other state controlling as much as 25%

4) In a multipolar system, three or more states each control at least 5% of the relative capabilities but no single state controls as much as 50% and no two states have as much as 25% apiece (pp. 598-600).

Thompson applies the four criteria to an index of global reach capabilities derived from shares of state-owned naval combat vessels. The data used to generate that index

can be found in Modelski and Thompson (1988). Thompson uses this index because (he argues) there is no dataset encompassing a number of capabilities that contribute to determining a country's power that spans a time frame commensurate with testing long cycle theory. The global reach capabilities index at least provides a measure that goes from 1494 to 1983, and it is, arguably, a reasonable proxy for other capabilities measures. Unfortunately, a problem with applying Thompson's global reach capabilities index to the European state system is that it does not provide a measure of essentially non-naval states such as Austria-Hungary or Prussia.

The task for this paper thus became clear. We need a broader measure of power for the countries of the European state system that minimizes biases caused by particular countries' circumstances, and we need to convert the resulting power shares into a determination of European system structure in terms of polarity categories.

A NEW MEASURE OF POWER IN THE EUROPEAN SYSTEM

The first step to getting a broader measure of country power entailed finding a second indicator compatible with the Modelski and Thompson naval data. Rasler and Thompson (1994) provide time series of the size of field combat armies for the major European countries from 1490 to 1945. If one combines an index of naval power in the European state system that can be generated from the data in Modelski and Thompson with an analogous index of land power that can be generated from Rasler and Thompson, one has created a military power index for the European state system for 1494 to 1945 that does not unfairly penalize the non-naval states.

Such an index was created for 10 European countries: Portugal, Spain, Netherlands, Italy, Austria-Hungary, United Kingdom, France, Germany, Russia, and Sweden. That was done by creating a spreadsheet containing the number of major naval vessels and the sizes of the army combat troops for each country for each year, summing to get the total number of ships and field combat troops for each year, calculating each country's share of the total for each variable (naval vessels and field combat troops) for each year, and then creating an index of military power that was the simple average of the two shares. An application of this 2-component index appears in Brecke (2001).

While arguably superior to a measure based on either naval power or land power alone, this 2-component index encompasses only the immediate war fighting capacity of a state. Most discussions of power argue that an element of capacity to support the machinery of war (latent power) must also be included (Waltz, 1979; Mearsheimer, 2001). Proxies for that notion of capacity typically include the size of the economy and the size of the population.

Fortunately, estimates of the population of different countries going back to 1400 and even earlier are available in McEvedy and Jones (1978). Even better, these estimates

include taking into account changes in the character and expanse of the countries as they have changed, sometimes dramatically, over the years we are concerned about.

Consequently, a third component for a country power index was created as follows. For each of the 10 countries, estimates of the populations at different points in time (e.g. 1600, 1650, 1700 and more precise dates where there were inflection points) were extracted from the graphs provided by McEvedy and Jones. These points served as the skeleton or anchor points for an interpolation procedure (*ipolate* command in Stata), and the resulting interpolated numbers served as the year-by-year population figures. The country population numbers were summed to a total population number for each year, and each country's share of the total population was calculated for each year. An interim 3-component index of country power was determined by calculating the simple average of the three components (shares), and an application of this index appears in Brecke (2002).

The fourth and final component of the country power index attempts to capture the ability of the economy to support a conflict. A commonly used measure is Gross National Product (GNP) or its close sibling, Gross Domestic Product. Mearsheimer (2001), for instance, uses GNP as a measure of a country's wealth, which he believes is the best single measure of a country's latent power.

That assertion is debatable. First, while a measure of the size of the economy is unquestionably important, population is perhaps as important as a measure of latent power. One need only consider attempts by Europeans to conquer Russia or, more recently, the Iraqi-Iranian war in the 1980s to be reminded that the ability to deploy a stream of troops at the enemy is an undeniable component of being able to repel an invasion. For that reason the country power index includes population. Also worth noting is that Thompson (1996) and Kim (1992) created long-term, three-component indices of country power consisting of navy ships, army troops, and population.

Second, it is not clear that the sheer size of an economy as measured by GNP is the best measure of latent power from the economy. GNP includes economic activities such as agriculture and services that are quite far removed from a war fighting capability. The manufacturing sector is the part of an economy most essential to supporting a war effort. In that light, a measure of a country's industrial production is arguably superior to GNP as a measure of the country's latent power.

Happily, relevant data exist, although they do not go as far back as 1494. A compilation of various countries' industrial production going back to 1750 can be found in Bairoch (1982), and one containing GNP data can be found in Bairoch (1976). For the purpose of creating a long-term index of country power, industrial production has a second virtue over GNP in that the longest available time series of

GNP for more than just a few countries in the Bairoch data only go back to 1830.[1]

Consequently, the fourth component of the country power index was generated as follows. For each of the 10 countries, Bairoch's industrial production data for different dates served as the anchor points for an interpolation procedure as was done for the population data. The resulting interpolated numbers served as the year-by-year industrial production figures. The country industrial production numbers were summed to a total industrial production number, and each country's share of the total was calculated for each year.

The index of country power, which is each country's share of the 10 countries' total power, was determined by calculating the simple average of the components, three components for 1494 to 1749 and four components from 1750 to 1945.

It must be noted that this index of power explicitly does not include a measure of political capacity such as that found in Kugler and Domke (1986). The reason is not data availability, although that would be a problem. More importantly, their measure of power attempts to get at the power behind war outcomes. This paper is concerned with an often different measure of a country's power, the power assessed in the decision of whether to go to war or not, power capability or potential power (Baldwin, 1979).

Since arguments regarding the relationship of system structure to conflict and stability focus on major powers, the calculation of the country power index went through a second iteration so that the index was based on the shares possessed by the major powers. If a country did not possess at least 5 % of the total system power in the calculation described in the previous paragraph, the country was excluded from the ranks of major powers. This adjustment was implemented by zeroing the country's data for those years, which forced the spreadsheet program to recalculate all of the sums and resulting shares for the remaining countries. The analysis done later in the paper is based on this refined set of power shares (components). This step resulted in a list of countries and when they were major powers that is presented in Table 1. To augment this table, Table A-1 in the Appendix provides a time series of the number of major powers. That table may prove useful to individuals wishing to follow the work of Morton and Starr (2001).

Table 1

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[1]Frank (1997) asserts that GNP calculations done by Paul Bairoch going back to 1750 can be found in in Braudel (1992). However, examination of Braudel's book does not provide the reader with GNP data of sufficient detail to match the industrial production data.

Major Power Status in the European System

Country	Years of Major Power Status (1494-1945)
Portugal	1494-1580
Spain	1494-1808
Austria-Hungary	1494-1919
United Kingdom	1494-1945
France	1494-1940, 1945
Netherlands	1579-1754
Sweden	1590-1740
Russia/Soviet Union	1700-1945
Germany/Prussia	1740-1944
Italy	1860-1944

To address the question of how this 4-component measure of country power compares to the well-known CINC score where they overlap (1816-1945), the Correlates of War National Material Capabilities dataset (Singer, 1987; Singer and Small, 1993) was used to create an analogous power index for the period 1816-1985 based on the six (five from 1816 to 1859) components of capability in that datafile as well as an extended version of that index which included the naval ships data from Modelski and Thompson (1988). Correlations between the different indices for the different countries varied in value, ranging from .43 to above .9 with most cases toward the higher values.

The raw and calculated data used for this calculation will be made available via the internet as soon as they have been approved by the peer review process for a separate paper that explains the data, the power index, and the resulting power trajectories in more detail.

DETERMINING SYSTEM STRUCTURE IN TERMS OF POLARITY CATEGORIES

Wilkinson (1999a) classifies system structure according to the following schema:

- Universal State/Empire
- Hegemony
- Unipolarity (non-hegemonic)
- Bipolarity
- Tripolarity
- Multipolarity
- Nonpolarity

Bipolarity, tripolarity, and multipolarity have their customary meanings, although, as Wilkinson (1996) notes, many analysts merge tripolarity and multipolarity. Universal state/empire is his term for the system type where one state encompasses the whole system. Hegemony describes a system type where a single very powerful state, a superpower, oversees a number of subject states still possessing internal autonomy. Unipolarity (non-hegemonic) encompasses the system type where there is one great power, lacking influence to match its capability, among a number of non-subject, non-tributary states. Nonpolarity delineates a system type with no great powers.

Wilkinson's classification scheme is attractive because it encompasses a broad range of system types, and perhaps most importantly, it includes tripolarity. In addition, Wilkinson's categories, as he defines them, correspond quite closely to those defined by Thompson. There are two notable differences in the names: Wilkinson's hegemony corresponds to Thompson's unipolar and Wilkinson's unipolarity corresponds to Thompson's near-unipolar, although how closely these last two categories match with each other is uncertain. The rest of the paper will employ the Thompson terminology.

To have the ability to distinguish tripolar systems from other multipolar systems, there needs to be an addition and a minor change to Thompson's definitions. Accordingly, a modified-Thompson set of coding rules was developed and is presented below:

1) In a unipolar system, one state controls 50% or more of the relative capabilities that matter

2) In a near-unipolar system, one state controls more than 45% but less than 50% of the relative capabilities and no other state possesses as much as 25%

3) In a bipolar system, two states control at least 50% of the relative capabilities and each of the two leading actors possess at least 25% with no other state controlling as much as 25%

4) In a tripolar system, three states each control at least 16.667 % of the relative capabilities and the criteria for the three previous types of systems are not met

5) In a multipolar system, three or more states each control at least 5% of the relative capabilities and the criteria for the other types of systems are not met.

This set of definitions possesses the virtues of being explicit (and thus reproducible), measurable, discerning among the different types of systems, and reasonably consistent with common-sense notions of what we might expect the distribution of capabilities to be for each type of system. Other definitions are, of course, possible and perhaps even desirable. Importantly, this set of definitions creates a schema for the European state system comparable to the categories used by Wilkinson for determining the structure over time of the Indic and Chinese state systems (1996 and

1999b, respectively).

DETERMINATION OF EUROPEAN SYSTEM STRUCTURE

If we apply the modified-Thompson coding criteria to the 4-component country power index, we can then develop a time-series of the European system's structure.

To develop that time-series, one first codes each country for each year into a particular power category depending upon the country's share value for the country power index. Each country is coded according to the following rules:

A - index value less than or equal to 5%
B - index value between 5% and 16.667%
C - index value between 16.667% and 25%
D - index value between 25% and 45%
E - index value between 45% and 50%
F - index value greater than 50%

Figure 2 depicts how that coding occurs. The top three rows are the power shares possessed by the 10 countries; the bottom three rows are the power shares for those rows converted to their category letter. Except for Portugal, the power shares for 1581 are similar to the 1580 values (the shares being slightly larger because of the removal of Portugal as a major power), and the category values are the same for the two years. This snapshot also portrays both the appearance and disappearance of a country from the set of major powers. (It is important to note that short, 1- or 2-year instances in which a country changed from one category to another and then back because of only a minor numerical change at a threshold were treated as no change in category.)

Figure 2

Translation of Power Shares to Power Categories

European Power Shares

11 Cols / 6 Rows	Year	PorShare	SpaShare	NetShare	ItaShare	A-HShare	UKShare	FraShare	GerShare	RusShare	SweShare
1	1578	0.116281	0.257059			0.123099	0.258026	0.265535			
2	1579	0.094378	0.221296	0.10536		0.12072	0.227914	0.230331			
3	1580	0.083159	0.279413	0.112867		0.103662	0.203888	0.217011			
4	1581		D	B		B	C	C			
5	1582		D	B		B	C	C			
6	1583		D	B		B	C	C			

0 \ 0 Selected

The second step is to take the resulting configuration of countries in terms of their power category and evaluate it against the modified-Thompson coding rules to determine the system structure. Since the countries' power category values are arranged in a grid (spreadsheet) format in which the countries are columns and the years are rows, it is easy to determine the system structure at each year simply by looking across a row in the spreadsheet and from the combination of letters ascertaining which of the five system structure possibilities presented above was appropriate. For example, 1581-1583 are coded as tripolar years. (As with the country power categories, short, 1- or 2-year instances in which the system structure changed from one polarity category to another and then back were treated as no change in category.)

From this set of steps emerges a determination of European system structure from 1494 to 1945. However, across those 452 years the system varied only across the categories: bipolar, tripolar, and multipolar. Yet if one looks at the Ray-Singer and Mansfield power concentration scores, the Rasler and Thompson leadershare measure, and, especially, the actual power shares data, it is clear that there are two periods where one country had considerably more power than any other country. In the late 16th century Spain stands out from the other countries, and in the late 17th century France towers above any other country. The Thompson (modified or not) coding rules fail to identify these periods as unique. Consequently, I created a new set of rules based on the modified-Thompson rules but with changed definitions for near-unipolar and unipolar systems. This new set of rules is presented below:

1) In a unipolar system, one state controls 40% or more of the relative capabilities that matter and possesses at least a 20 percentage point margin over any other country

2) In a near-unipolar system, one state controls more than one-third (33.333%) of the relative capabilities and possesses at least a 15 percentage point margin over any other country

3) In a bipolar system, two states control at least 50% of the relative capabilities and each of the two leading actors possess at least 25% with no other state controlling as much as 25%

4) In a tripolar system, three states each control at least 16.667 % of the relative capabilities and the criteria for the three previous types of systems are not met

5) In a multipolar system, three or more states each control at least 5% of the relative capabilities and the criteria for the other types of systems are not met.

These coding rule changes result in changed system structure determinations for the

two periods when Spain and France, respectively, dominated. Consequently, this last set of coding rules is used for the subsequent analysis. Table A-2 in the Appendix presents the alternative system structure time series using the modified-Thompson and my coding rules. The time series used for the analysis in this paper appears in Table 2.

Table 2

European System Structure 1494-1945

Period	System Type
1494-1499	Tripolar
1500-1501	Bipolar
1502-1529	Multipolar
1530-1540	Tripolar
1541-1546	Multipolar
1547-1550	Tripolar
1551-1559	Multipolar
1560-1584	Tripolar
1585-1604	Near-Unipolar
1605-1619	Multipolar
1620-1659	Tripolar
1660-1667	Multipolar
1668-1674	Near-Unipolar
1675-1679	Unipolar
1680-1690	Near-Unipolar
1691-1696	Unipolar
1696-1699	Near-Unipolar
1700-1714	Multipolar
1715-1735	Tripolar
1736-1749	Multipolar
1750-1814	Tripolar
1815-1859	Bipolar
1860-1870	Tripolar
1871-1875	Multipolar
1876-1909	Tripolar
1910-1914	Bipolar
1915-1917	Tripolar
1918-1919	Multipolar
1920-1935	Bipolar
1936-1940	Tripolar
1941-1945	Bipolar

The amount of time the European state system was in each type of system breaks down as follows.

Unipolar	2.4%
Near-unipolar	9.1%
Bipolar	16.2%
Tripolar	50.0%
Multipolar	22.3%

Alternative sets of decision rule sets were investigated to ascertain the sensitivity of this system structure determination to the rules used. The rules chosen make a modest difference. To select the rules to be used in the analysis, the different findings were compared against other over time system structure determinations, especially Hopf (1991) and Midlarsky (1974). The rules delineated above provided the best "fit."

SYSTEM STRUCTURE AND VIOLENT CONFLICT

With this empirically-based calculation of the European state system structure, we can return to the original question of does system structure impact the frequency of warfare, and if so, how. This paper uses the simplest conceivable comparison technique. We determine the number of years that a state system was in each of different system types and calculate the proportion of years that the system was in each system type. We then allocate the conflicts experienced by the state system to the type of system operative when they began. From that we calculate the share of the total set of conflicts of allocated to each system type.

Finally, we derive a ratio consisting of the share of conflicts in each system type divided by the share of years in each system type. If system structure has *no* impact, one would expect the frequency of conflict to not vary across system type. Thus, the ratio would be at or near 1.0; the share of conflicts across any set of years determined by a system type would be no different from any other set of years. If the ratio for a particular system type is higher than one, then that system type appears to be less effective at controlling the outbreak of violent conflict (or conversely, is more conducive to inciting the outbreak). If the ratio is less than one, the system type appears to be superior at controlling or inhibiting violent conflict.

This type of analysis was applied to the European state system, the Chinese state system, and the Indic state system.

European State System

We tested the European state system using three different sets of conflicts. The first is the European interstate conflicts within the much more comprehensive Conflict Catalog (Brecke, 1998). The second set was derived by combining the European interstate wars in the Correlates of War International and Civil War dataset (Singer,

1987; Singer and Small, 1994), the European wars in the Major-Minor Power Wars dataset (Midlarsky, 1988; Midlarsky and Park, 1994), and the wars in the Great Power Wars dataset (Levy, 1983; Levy, 1994). The third set was just the Great Power Wars dataset. The first set includes large and small conflicts conducted by both powerful and not-so-powerful states. The second contains only large conflicts and emphasizes those conducted at least in part by major powers. The third consists only of wars among the major powers. The Conflict Catalog is a superset of of the Combined Datasets, which in turn is a superset of the Great Power Wars dataset. Using the three sets enables a comparison of system structure's impact on conflict in the system in general as opposed to large conflicts involving the major countries or large conflicts just among the major countries.

The first results presented below pertain to the period 1494-1985. This was done by simply classifying Europe as a bipolar system from 1946 to 1985. Subsequent results will cover the period 1494-1945.

Table 3 presents for the European state system the number of conflicts, the share of conflicts, the number of years, the share of years, and the conflict/years ratio for each system type for both sets of European conflicts.

Two results stand out in Table 3. Bipolarity easily gets the nod as the most desirable system structure in terms of limiting violent conflict. In contrast, multipolarity does very poorly. These findings apply to large interstate conflicts as well as all interstate conflicts. Tripolarity appears to have little to no impact. Unipolarity and near-unipolarity vary significantly across the three conflict sets, but this may be an artifact of the rather small sample sizes, especially for unipolarity.

One question that arises from these results is: what is the impact of nuclear weapons and the Cold War on these findings? Table 4 addresses that question by portraying the results when they are recalculated for the period 1494-1945.

What we find in Table 4 is that the pacifying effect of bipolarity remains. The same can be said for tripolarity's neutral effect. In contrast, multipolarity retains its status of being an apparently conflict exacerbating system structure. Although sample size questions must make any assertion tentative, unipolarity seems to have a positive impact, especially with respect to large conflicts while near-unipolarity appears to cut both ways, faring especially poorly with large conflicts.

To facilitate analysis, Figure 3 put the results of Table 4 into a graphical depiction analogous to Figure 1. A value above 1 indicates that the system type has a positive propensity for avoiding conflict while a value below 1 signals that the system type experienced more conflict than would be expected given the number of years that the system was in that particular system type. The system types can be identified as follows: 1-unipolar, 1.5-near-unipolar, 2-bipolar, 3-tripolar, 4-multipolar.

The plots in Figure 3 lend support for both those who advocate hegemony/unipolarity and those advocating bipolarity, especially the latter group. For both the great power wars and all interstate wars, unipolarity fared well. However, bipolarity did well for all three sets of conflicts, and there were many more years of bipolarity, thus the finding is stronger. Figure 3 makes it clear that proponents of multipolarity, and to a lesser extent tripolarity, have little empirical support for their positions. It is interesting to note that the Conflict Catalog traces the Great Power Wars except for being attenuated.

Table 3

Pattern of Years and Conflicts per System Type: 1494-1985

Conflict Catalog	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Unipolar	8	.016	11	.022	.727
Near-Unipolar	45	.097	41	.083	1.169
Bipolar	64	.13	113	.23	.565
Tripolar	233	.472	226	.459	1.028
Multipolar	144	.291	101	.205	1.42
	494		492		

Combined Wars	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Unipolar	3	.027	11	.022	1.227
Near-Unipolar	8	.072	41	.083	.867
Bipolar	13	.117	113	.23	.509
Tripolar	55	.495	226	.459	1.078
Multipolar	32	.288	101	.205	1.405
	111		492		

Great Power Wars	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Unipolar	0	.0	11	.022	0
Near-Unipolar	6	.13	41	.083	1.566
Bipolar	3	.065	113	.23	.283
Tripolar	21	.456	226	.459	.993
Multipolar	16	.348	101	.205	1.698
	46		492		

Table 4

Pattern of Years and Conflicts per System Type: 1494-1945

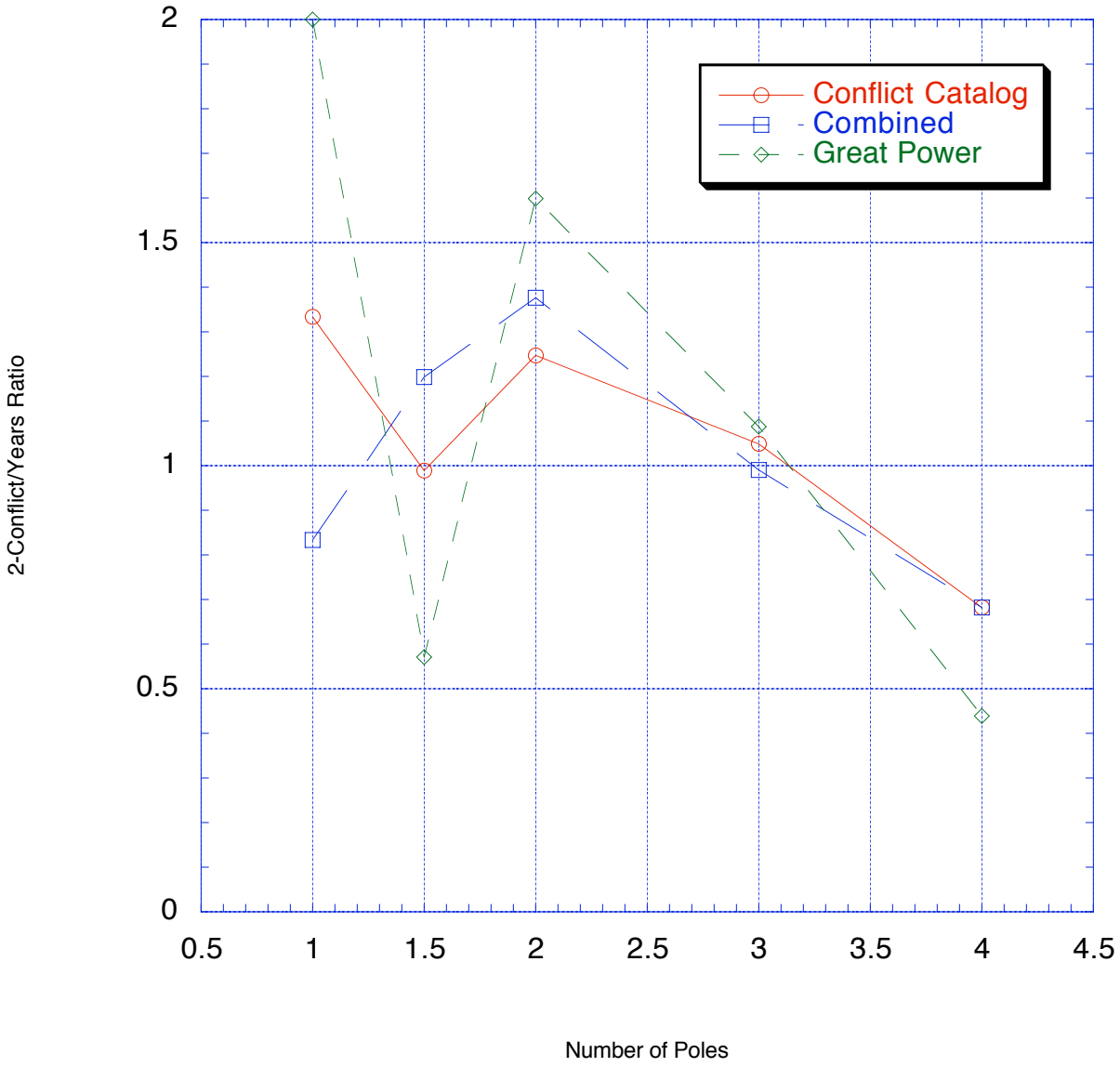
Conflict Catalog	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Unipolar	8	.016	11	.024	.667
Near-Unipolar	45	.092	41	.091	1.011
Bipolar	60	.122	73	.162	.753
Tripolar	233	.476	226	.5	.952
Multipolar	144	.294	101	.223	1.318
	490		452		

Combined Wars	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Unipolar	3	.028	11	.024	1.167
Near-Unipolar	8	.073	41	.091	.802
Bipolar	11	.101	73	.162	.623
Tripolar	55	.505	226	.5	1.01
Multipolar	32	.294	101	.223	1.318
	109		452		

Great Power Wars	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Unipolar	0	.0	11	.024	0
Near-Unipolar	6	.13	41	.091	1.429
Bipolar	3	.065	73	.162	.401
Tripolar	21	.456	226	.5	.912
Multipolar	16	.348	101	.223	1.561
	46		452		

Figure 3

Propensity for Avoiding Conflict: Results from European State System



Chinese State System

Fortunately, the impact of system structure on warfare can be tested, because of Wilkinson's Chinese and Indic system structure data, with two other state systems. Let us first compare Wilkinson's Chinese system structure data with Lee's (1931) time-series of the frequency of wars in China augmented for the period prior to 221 BC by Chinese-language data gathered as part of the Conflict Catalog project.

Wilkinson (1999b) allocates each 25-year interval in Chinese history from 1025 BC to 1850 AD to one of the seven system structures listed earlier. It is again worth noting that except for the addition of the two "extreme" possibilities, effective centralized governance and no major powers, Wilkinson's list closely resembles the distinctions based on Thompson (1986) described earlier.

If we perform the same type of comparison with the Chinese system data as we did with the European system data, but limit ourselves to the timeframe 725 BC to 1850 AD because of limitations in the conflict data, we find the following in Table 5.

Table 5

Pattern of Years and Conflicts per System Type: China

	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Universal Empire	179	.078	300	.117	.667
Unipolar	46	.02	50	.019	1.053
Near-Unipolar	594	.258	775	.301	.857
Bipolar	379	.165	350	.136	1.213
Tripolar	99	.043	275	.107	.402
Multipolar	941	.409	800	.311	1.315
Nonpolar	62	.027	25	.01	2.7
	2300		2575		

The results from Table 5 only partly agree with the earlier findings. Multipolarity again

appears to be relatively war-prone while near-unipolarity is moderately peace enhancing. On the other hand, bipolarity appears conflict-prone while periods of tripolarity experienced a dramatic dearth of conflict compared to what would be expected. It is worth noting that nonpolarity appears to correspond with extensive violent conflict while universal empire appears very peaceable.

Indic State System

Let us next do an analogous comparison with the Indic system. Unfortunately, accomplishing this task was significantly more time intensive than what was needed for the other two systems. While Wilkinson (1996) allocates each 10-year interval in Indian history from 550 BC to 1800 AD to one of the seven system structures, there is no compilation of Indian subcontinent conflicts analogous to Lee's (1931) effort for China. I thus have been assembling such a compilation using primarily Schwarzberg (1992) and Schmidt (1995). I currently have a list from 550 BC to 1800 AD completed, but because of limitations in the data, the findings below in Table 6 will be from the timeframe 500 AD to 1800 AD where the data are much more reliable. This set of conflicts is most directly comparable to those in the Conflict Catalog set discussed earlier.

If we perform the same type of comparison as above with the Indic system data, we get the results found in Table 6.

The pattern for the Indic system in part agrees and in part differs from the previous systems. Perhaps most notably, tripolarity maintains a perfect record in terms of being more peaceful than what would be expected. Bipolarity, on the other hand, manifests a very mild peacefulness as it did with respect to Europe but not with China. Notably, multipolarity comes out as very mildly peace enhancing, and near-unipolarity comes out as relatively conflict-prone, results which are in contrast with previous findings. Unipolarity appears relatively more conflict-prone than in the other systems. Nonpolarity differs dramatically from the one possible comparison, the Chinese state system, being very peaceful as opposed to being very war-prone.

Table 7 summarizes the findings by presenting the conflict/years ratios found in Tables 4, 5, and 6.

Figure 4 does for the three state systems what Figure 3 did for Europe by placing some of the results of Table 7 into a graphical depiction analogous to Figure 1. Europe is represented by the Conflict Catalog results as they are most comparable to the Chinese and Indian results because of the nature of the conflicts included in the data files.

Table 6

Pattern of Years and Conflicts per System Type: Indian subcontinent

	Number of Conflicts	Share of Conflicts	Number of Years	Share of Years	Conflict/ Years Ratio
Unipolar	49	.071	80	.062	1.145
Near-Unipolar	275	.4	470	.362	1.105
Bipolar	254	.369	500	.385	.958
Tripolar	53	.077	130	.10	.77
Multipolar	36	.052	70	.054	.963
Nonpolar	21	.031	50	.038	.816
	688		1300		

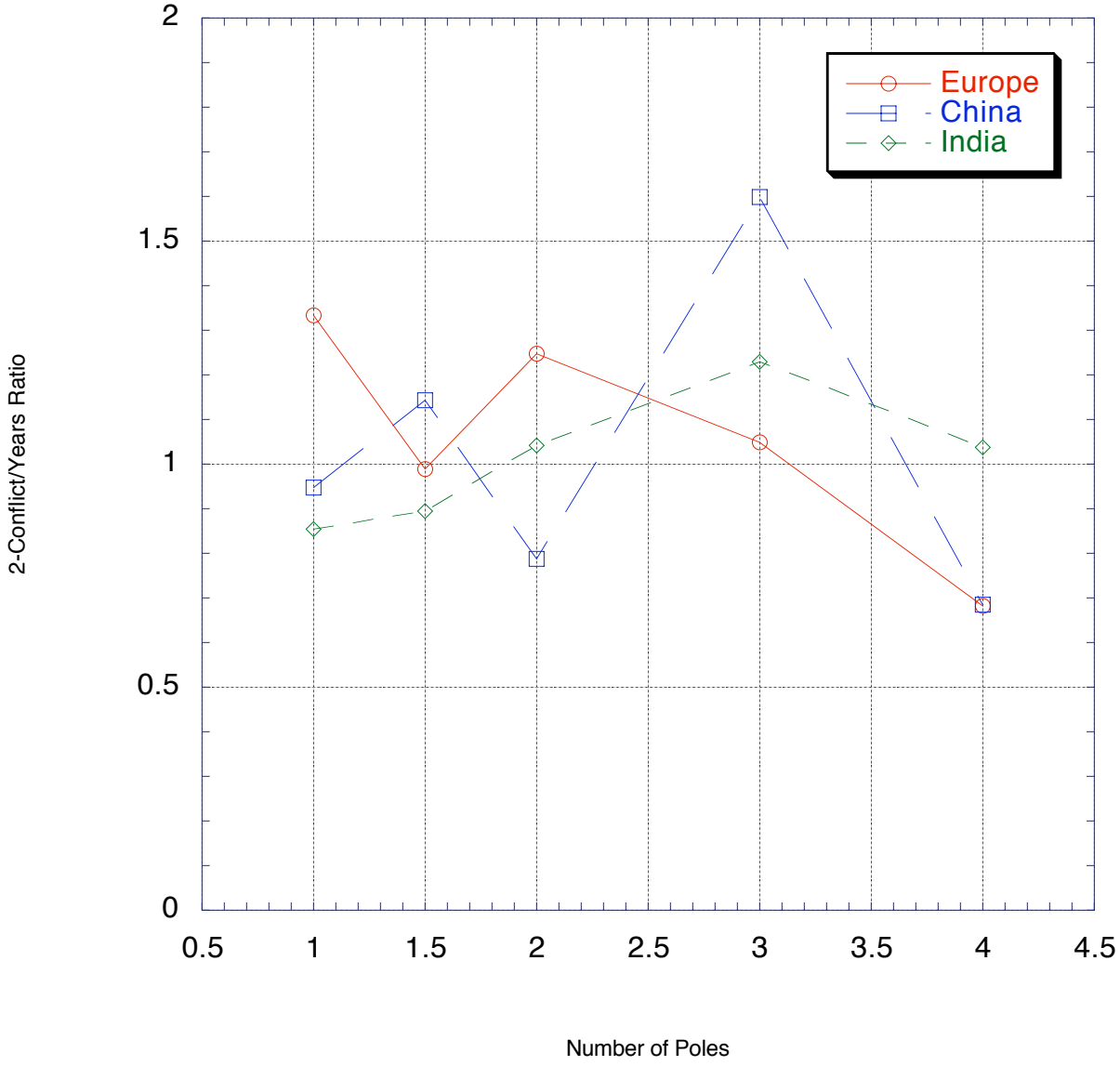
Table 7

Comparison of System Types Across Different State Systems: Conflict/Years Ratio

	Europe: Conflict Catalog	Europe: Combined Datasets	Europe: Great Powers	China	Indian Sub-continent
Unipolar	.667	1.167	0	1.053	1.145
Near-Unipolar	1.011	.802	1.429	.857	1.105
Bipolar	.753	.623	.401	1.213	.958
Tripolar	.952	1.01	.912	.402	.77
Multipolar	1.318	1.318	1.561	1.315	.963
Nonpolar				2.729	.816

Figure 4

Propensity for Avoiding Conflict: Results from Three State Systems



Two main findings emerge from this cross-system comparison. First, hoped-for congruity of the findings across the three state systems did not emerge. Whether the differing results arise from differences in data coding by me or others or from "real" differences in the impact of system structure across cultures is unknown. Second, despite the differences, tripolarity appears to have a cross-system pacifying effect, although the intensity of that effect differs markedly.

More generally, if one compares Figures 3 and 4 with Figure 1, the first thing one sees is that the relatively simple and clean lines that emerge from the theoretical arguments do not get reproduced in the data.

CONCLUSION

What can we conclude? Evidence from three distinct state systems indicate that system structure does make a difference, but the findings are not as consistent as what we would perhaps prefer. Most of the system types varied across state systems in terms of the amount of violent conflict experienced compared to what would be expected. Perhaps the most noteworthy finding is that at least for the European state system, where the data are most fully developed, bipolarity is the "best" system structure.

While the findings from this project indicate that power distribution as manifested in system structure has an impact on the level of conflict, the variations in the findings signal that (as we would expect) other things are going on. Even if we restrict ourselves to questions relating to power, other aspects of power relationships and violent conflict need to be explored. Examples of these aspects include power concentration, power parity, power transitions, and power cycles. The data generated for this project are appropriate to and will be made available so that these other aspects of power relationships and their impact on violent conflict can be explored.

Similarly, this paper as part of its mission to test the relationship of system structure to violent conflict, has generated other second-order data about the European system that other scholars may wish to use. Other studies have used information regarding the number of major powers in the system at different points in time, who are the major powers at any given time, and what was the polarity of the system at any given time. This paper provides this information with as strong an empirical backing as I am able to supply.

More broadly, this paper will hopefully contribute to better theorizing about the causes of warfare. It goes beyond previous efforts in its attempt to use empirical evidence to answer the questions posed at the beginning of this paper. Hopefully, future scholars will use these findings to shape and constrain their theoretical formulations. In addition, this paper demonstrates that data about regions and times up to now almost

ignored by European and North American scholars of war can be fruitfully applied to those questions.

APPENDIX

Table A-1

Number of Major Powers in the European State System 1494-1945

Period	Number of Major Powers
1494-1578	5
1579-1580	6
1581-1589	5
1590-1699	6
1700-1739	7
1740	8
1741-1754	7
1755-1808	6
1809-1859	5
1860-1919	6
1920-1944	5
1945	3

Table A-2

Alternative Codings of European System Structure 1494-1945

Period	Modified-Thompson Coding Rules	Period	Brecke Coding Rules
1494-1499	Tripolar		
1500-1501	Bipolar		
1502-1529	Multipolar		
1530-1540	Tripolar		
1541-1546	Multipolar		
1547-1550	Tripolar		
1551-1559	Multipolar		
1560-1589	Tripolar	1560-1584	Tripolar
		1585-1604	Near-Unipolar
1590-1619	Multipolar	1605-1619	Multipolar

1620-1659	Tripolar		
1660-1714	Multipolar	1660-1667	Multipolar
		1668-1674	Near-Unipolar
		1675-1679	Unipolar
		1680-1690	Near-Unipolar
		1691-1696	Unipolar
		1696-1699	Near-Unipolar
		1700-1714	Multipolar
1715-1735	Tripolar		
1736-1749	Multipolar		
1750-1814	Tripolar		
1815-1859	Bipolar		
1860-1870	Tripolar		
1871-1875	Multipolar		
1876-1909	Tripolar		
1910-1914	Bipolar		
1915-1917	Tripolar		
1918-1919	Multipolar		
1920-1935	Bipolar		
1936-1940	Tripolar		
1941-1945	Bipolar		

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