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## **Violence Prediction**

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## GLOSSARY

**democracy** A political system identified by freely contested elections by a wide electorate and an executive responsible to popular control.

**dyad** A pair of any unit, in this case nation-states.

**international system** A group of interacting nation-states making interdependent decisions; may be either regional or global.

**militarized international dispute (MID)** A conflict between nation-states in which one or both states threatens to use military force or does use it.

**war, civil** An intrastate conflict involving the government as one party, resulting in at least 1,000 war-related deaths in at least one year and 200 deaths per year in other years.

**war, interstate** A militarized dispute between independent nation-states, resulting in at least 1,000 deaths of military personnel.

THE ABILITY TO PREDICT LARGE-SCALE ORGANIZED VIOLENCE, whether in civil wars within countries or confrontations between countries internationally, has become much more feasible because of the accumulation of large-scale information bases combined with advances in theory and statistical analysis. Although systematic analysis of such matters largely began only in the 1990s, substantial progress has been made in identifying risk factors for the outbreak of violent conflict.

## I. INTRODUCTION

The systematic prediction of international conflict has depended upon theory and data from three levels of analysis: unit level (i.e., the nation-state, or country) the level of the international system, and, between those, the dyadic level (pairs of countries).

A. Country. It has long been known that great powers, due to their wide-ranging political and economic interests combined with the military power to exert force far from the home country, are many times more likely to become involved in violent conflict than are small or weak states. Other than this, however, strong generalizations about the risk factors for violence by particular kinds of states have proved elusive. There is some evidence that democracies are less likely to engage in violent conflict than are autocracies, but that evidence is contested, the relationship is fairly weak, and the class of autocracies is too varied (communist and fascist regimes, military dictatorships, traditional monarchies) for easy generalization.

B. International system. Other efforts have been directed to understanding risk factors according to different kinds of international systems, including both the global international system and regional subsystems. An international system is identified as a group of interacting nation-states, in which strategic actors make interdependent decisions. For much of history a truly global international system did not exist, as the level of technology to permit a high level of

interaction among distant countries was too low. A system of warring state-like units existed in China at least 3500 years ago, however, and even earlier in Mesopotamia. A regional interstate system existed among Mayan city-states in Central America from about 800 BC to 800 AD, with some revival up to the Spanish conquest. But until the conquest, none of them had had any interaction with or even knowledge of a European system, nor European states of them. Not until the nineteenth century did a sufficiently high level of interaction develop for the concept of a global system to be very useful.

A global system, like a regional system, can be characterized by its degree of hierarchy, or by its polarity. If it were dominated by one great power, a hegemon, it would be unipolar. By contrast, a system dominated by two big powers would be bipolar, and one of three or more great powers would be multipolar. Different theories led to expectations that some kinds of systems were more prone to large-scale international violence than were others; for example that bipolar systems were likely to experience more small wars than were multipolar systems, but fewer big wars directly between the two big states. The cold war era between the United States and the Soviet Union was such a system. The evidence available for generalization, however, was so mixed as to prevent any consensus on relative risks. One problem was the small number of international systems from which to attempt to make any reliable generalizations. Another was imprecision or lack of consensus on theory. In measuring polarity some analysts would focus attention more on the structure of alliance systems than on the number of great powers; for example, in 1914 there were perhaps as many as eight great powers in the international system, but only two competing alliance configurations of great powers (Britain, France, and Russia vs. Germany, Austria-Hungary, and Italy).

C. Dyad. A major conceptual breakthrough, focusing on the characteristics of pairs of states, however, contributed to greater success in identifying, both theoretically and empirically, the risk factors of international conflict. It drew on the insight that it was not so much the characteristics of individual countries but of their relationships with other countries that mattered. Most countries are neither especially peaceful nor especially war-prone in general; their readiness to engage in violent conflict varies over time and with regard to particular other countries. For example, powerful states might be reluctant to fight other powerful states (with whom the outcome of a war might be unpredictable) but often to fight weak states whom over whom they could be much more confident of victory. Although this leads to competing theoretical expectations for war frequency (weak states might make great concessions to powerful ones, making war unnecessary and rare) the insight that relative power would matter to behavior was an important one. Furthermore, an international system of, for example, 100 countries has 4850 *pairs* of states, in principle providing enough observations to make statistical testing of competing hypotheses. In turn the hypotheses could be refined by careful strategic analysis, including the application of game theory to questions of how states would behave under conditions of uncertainty about each other's intentions or capability.

Meanwhile, information-gathering and data-refinement was making possible the accumulation of large-scale databases on the characteristics and behavior of states and dyads in the modern international system. With the support of private foundations and government agencies, increasingly more comprehensive and accurate information became available about the member countries of the international system in the nineteenth and especially twentieth centuries. This information—typically compiled initially on a country-year (one observation for each year a country is a member of the system) basis and then converted into dyad-year format—

permits the testing of hypotheses about a variety of conditions long thought to affect the risk of violent conflict, with enough cases to make statistical generalizations about relative risks. In effect, violence and war could be considered as cases in an epidemic, and social scientists could investigate hypotheses from competing theoretical perspectives about what factors might promote the onset of violence.

## II. INDUCEMENTS AND SUPPRESSORS OF VIOLENCE

Those hypotheses can be further characterized as about inducements or suppressors of violent conflict. While the inducement/suppressor distinction is somewhat arbitrary, it is useful. Just as most people are often free of life-threatening diseases, most pairs of countries are not usually at great risk of fighting each other. They lack the opportunity to fight, and sufficient reason to make the decision to fight. Their relations are “thin,” and rather than being characterized by many peaceful interactions the two countries are more accurately described as being politically irrelevant to each other; “peace” is more nearly explained by their lack of interaction than by the presence of positive interactions. Accordingly, the idea of inducement recognizes that incentives and capabilities to fight vary widely. The concept of suppressor, however, acknowledges that even when pairs of countries have the ability and inducements to fight they may resolve their disputes without recourse to violence because aspects of their political and economic relationships suppress the incentives to use violence.

### A. Inducements to conflict:

1. Geographical proximity. Countries situated near each other, either contiguous on land or separated by narrow bodies of water, can exert military force (invading, or bombing). Moreover, nearby countries are more likely to have issues in dispute; i.e., control of natural resources or treatment of ethnic groups that may overlap national borders. Countries separated

by great distances, however, may have neither the ability nor the incentive to fight each other. Topography, in the form of large bodies of water or mountain ranges, may sometimes take the place of distance in reducing inducements.

2. Major power status. Great powers are less inhibited by distance, because they are more likely to have strategic and economic interests far from home, and a powerful economic base to support military capabilities (ships, planes, missiles) for exerting force at a distance. Thus if one or both states in a dyad is a major power as measured by economic and military capabilities, other influences being equal the dyad is at greater risk of violent conflict than is a dyad comprising two minor powers.

3. Equality of power. As noted above, there have been conflicting theories about the effect of power equality or disparity. Great disparity may be an inducement to initiating violence by the powerful, and a constraint on the weak. Ascertaining the net effect of those two requires an empirical test. So too do hypotheses about the effect of a parity of power: by contributing to uncertainty about which side would triumph in a military confrontation, does balanced power make states more or less willing to initiate violence?

4. Ethnic differences. Since proximity often provides countries—like individuals—with issues to fight about, it is important to specify what those might be. Most obviously, only countries that are adjacent can fight about how the borders between them should be resolved. Because borders divide or unite ethnic groups, it becomes necessary to ask whether a dyad comprised of two countries of very different racial, religious, or linguistic groups is at greater risk for international violent conflict than one where the two states are ethnically similar.

B. Suppressors of conflict. Since many dyads where the member countries appear to share inducements to fight do not actually do so, we must look to possible suppressors of violent conflict to explain why they do not fight.

1. Democratic institutions and practices. Type of political system is a powerful predictor of conflict within dyads. The more democratic the two states are, the less likely they are to become involved in violent conflict. More precisely, since lack of democracy can be seen as a weak link in the suppression of international violence, the political characteristics of the less democratic state are most important: the more democratic is the less democratic state, the less likely is a violent conflict between the two members of the dyad. Making it more democratic should constrain it far more than would come from raising the level of the already more democratic member, which already is quite constrained. Several reasons for this effect have been advanced (Russett 1993).

Democratic leaders are constrained from initiating international violence so as to satisfy their own private goals, because they are subject to removal from office in regular elections. A leader who takes his country into a violent conflict that proves costly to a wide segment of the electorate risks being defeated in the next election. The longer or more costly the war the greater that risk—which is particularly great if the country is defeated. By contrast, leaders of dictatorships do not have to satisfy a broad portion of the country. They may pursue private gains, and even survive defeat, so long as they can retain the loyalty of a rather narrow group of supporters, including the police and armed forces (Bueno de Mesquita et al. 2002).

Moreover, democracies have developed institutions and principles for resolving political conflicts without the use or threat of violence within the country. Leaders in such a culture of non-violent conflict resolution are likely to recognize leaders of other countries with similar



experience and expectations. And their people are more likely to hold them to such practices with regard to other democratic countries.

Finally, the transparency of democratic institutions and debates provides a means whereby democratic leaders can credibly communicate their resolve and popular support, either for non-violent conflict resolution or the use of force. If the leader's political opposition supports the position she takes vis-à-vis another state, her determination is more credible. If not, she is in a poor position to bluff about a willingness to use force, and is less likely to do so (Schultz 2001).

The reasons why democracies are less likely to use military force doubtless vary between different countries and over time, and these different reasons also probably reinforce each other. Whereas there is some evidence that democracies are somewhat more peaceful in general (a unit effect, mentioned above), the stronger and more reliable effect is in the relations between two democratic countries. Type of political system is typically measured on an ordinal or interval scale, of which the most widely utilized one derives from the Polity Project (Jagers and Gurr 1995).

2. Economic interdependence. This operates in ways with important parallels to democracy. Economically important trade typically produces powerful political interests in domestic politics—interests in maintaining peaceful relations with countries that provide needed imports or serve as export markets. Within a dyad, the greater the contribution of mutual trade to the gross national product of the less economically dependent partner (again, the weak link for suppressors), the less likely is a violent conflict between the two countries. Broad-gauged trade may also serve as an instrument for countries to communicate their preferences and intentions. Ties of international investment are likely to have similar effects in creating and communicating

interests. But whereas good data on bilateral trade now exists, information on bilateral international investments flows is much sparser and its effect is much less well established.

3. International organizations. International organizations are of many types and are created for many purposes. They range from organizations of quasi-universal membership to regional or other specialized organizations to promote security, human rights, shared economic interests, common environmental concerns, and others. International organizations are of two types: intergovernmental organizations (IGOs) whose members are states, and international non-governmental organizations (INGOs) formed by transnational private institutions. At the present time, only the effect of IGOs has been analyzed sufficiently to contribute to systematic violence prediction.

A few IGOs are quite strong, with an ability to enforce decisions on member countries. Most are weaker, but virtually all have institutions and practices for mediating conflicts, reducing uncertainty by conveying information and facilitating commitments, problem-solving, and shaping norms and practices of conflict resolution. It appears that the greater the number of international organizations in which both members of a dyad share membership, the less likely they are to engage in militarized conflict. Yet, perhaps because the characteristics and purposes of international organizations vary so greatly, this effect is weaker and less reliable than is the influence of democracy and economic interdependence. Since the number of shared IGO memberships is the same for both states there is no reason to identify one state as the weaker link.

4. Alliances. Military alliances, especially multilateral ones, constitute a subcategory of international organizations. But because they are concerned with commitments and preparations to use military force against non-members, their role as suppressors of violence among members

rates special attention. Since the members share common security interests, they have strong incentives not to fight each other. Moreover, alliances often create institutional means to mediate or resolve, short of violence, conflicts of interest among members. Countries, however, typically join alliances because they believe they share similar interests. For example, during the cold war era democracies with capitalist market economies frequently allied with each other. Thus alliances may not be truly causal in reducing the risk of violence among their members, but simply reflect an existing relatively peaceful state of relations.

### III. INTERNATIONAL CONFLICTS: EVIDENCE SINCE 1885

A. “Epidemiological” databases. Large-scale information bases have recently been compiled on the experience of violent international conflict. They apply to all independent countries in the international system, and go back with substantial detail and accuracy to 1815, the end of the Napoleonic Wars. Such a long historical reach nevertheless has limitations. Economic data (on gross domestic product, and bilateral trade flows) are sparse and unreliable for many countries during much of the nineteenth century, and some other influences, such as IGOs, were so rare then that membership in IGOs is nearly irrelevant. Furthermore, democracies were few and far between at that time, and even in countries that were relatively democratic (i.e., the United States, or the United Kingdom) large numbers of citizens lacked voting rights, due to restrictions of the electorate by race, gender, and property qualifications. These limitations began to ease in the later years of the nineteenth century, though women’s suffrage generally occurred only in the early decades of the twentieth century and other restrictions persisted still later. Many analyses are to the post-World War II era, though increasingly analysts go back to 1885 if not earlier. Presently most analyses do not extend forward beyond 1992, due chiefly to the lack of an agreed database on militarized international disputes. A major effort is being

made, however, to fill this information gap. Data on the explanatory variables are available up to a year or two behind the current year, however, so some early-warning forecasting is possible.

1. A long-term database is essential for effective violence prediction for several reasons. One is that international war is a relatively rare phenomenon. A common and arbitrary but reasonable criterion of war is that at least 1,000 deaths of military personnel must occur. By this standard, only about 150 international wars have been fought since 1815, of which fewer than 100 were interstate wars (between independent countries; the rest are colonial wars in which the target did not have international recognition as an independent state). At the dyadic level of analysis the number of warring pairs of states is larger, since in multistate wars each state on one side would be paired with every state on the other. Even so the small number of warring dyads inhibits the creation of truly robust estimates of relative risk factors.

Consequently, it is common to analyze the causes of militarized international disputes (MIDs), defined as any use or threat to use military force. These are explicit, overt, not accidental, and government approved; they may take the form of verbal diplomatic warnings, troop or ship movements constituting a demonstration of force, or actual use of force at any level up to and including war. MIDs are compiled on a five-point scale from 0 (no dispute) to 4 (war). By far the numerically largest category (about 70 percent of all MIDs) is category 3, use of force short of war. Because of controversy about whether this is a true scale, many analyses either address the causes of all MIDs, or simply of wars. Recent analyses, however, often focus on fatal disputes; that is, MIDs in which there is at least one combat death. An analysis of all MIDs expands the violent event base to approximately 30 times larger than the number of wars alone, to nearly 10,000 dispute-years in a total population of about 300,000 dyad years from 1885 to 1992. Only wars kill large numbers of people directly; most disputes do not directly result in any

deaths. Non-fatal disputes are important, nonetheless, because virtually all wars or lesser fatal disputes start as lower-level disputes which escalate. Wars arise from a pattern of hostile relationships, not simply out of the blue. Moreover, low level disputes—especially if repeated over several years—create a climate of international tension in which the resources of countries and of governments may be diverted from peaceful pursuits such as public expenditures for health to military preparations and arms races. Thus they may indirectly contribute to deaths that could otherwise be avoided.

Analyses may look at all dispute-years, or only at the first year of disputes that extend over more than one year. From the analogy to epidemiological studies in medicine it would seem necessary to distinguish initial years from years of continuing disputes, on the grounds that what causes the condition to arise may well not be the same as what contributes to its continuation. Certainly this distinction needs to be made. Nevertheless, disputes do not necessarily continue at the same level of threat or violence at which they began. Political decision makers constantly re-assess their use or threat of force, and may choose to escalate, de-escalate, or discontinue the dispute. Existing theory does not give good guidance as to whether risk factors for dispute initiation will be markedly different from those for continuation, so empirical examination is important.

2. Another reason to examine a long-term database is that potentially important aspects of the international system change over time. The country-level characteristics of political systems have changed markedly. In the years 1885-1918 the majority of states were autocracies, and save for relatively brief spurts of democratization after World Wars I and II democracies remained in the minority until the beginning of the 1990s. Moreover, the characteristics of democracies changed. If, for example, the ability of democracies to avoid military disputes with

one another depends on wide and representative popular vote, the great majority of states called democracies before World War I lacked it. Therefore one should not readily expect that democratic restraints on international violence were as effective in those years as they became later.

Similarly, systemic characteristics change over time. Throughout the years 1885-1945 the international system was multipolar, with between 6 and 8 countries characterized as great powers in a similar range of overall military capabilities. Only during the cold war era was the international system bipolar. Since the economic and political disintegration of the Soviet Union, it has become common to characterize the international system as unipolar. If theories relating international polarity to the frequency of violent conflict have validity, it would be misleading to analyze, for example, only dyad-years since World War II (Gowa 1999). Similarly, many theorists contend that nuclear weapons make states more cautious in using military force, or even in threatening to use force in conditions of diplomatic crisis. Risk factors for militarized disputes might be different in the nuclear weapons era than in pre-nuclear years.

3. It is also important to have as complete a cross-national sample as possible. Information on most of the important variables is now available for most states. The greatest difficulty has been with economic variables—GDP and bilateral trade—for the pre-1950 years and for non-members of the International Monetary Fund (chiefly many of the communist countries) during the cold war era. Recent efforts to complete this information from country sources, however, have been quite successful. In many instances where information is incomplete (e.g., pairs of small distant countries before World War I; countries in extended hostile relationships, such as North and South Korea, Israel and many Arab states) trade may safely be estimated as near-zero. Many analyses have been limited to so-called politically

relevant dyads; i.e., to geographically contiguous countries or to dyads in which one or both countries is a major power, with widespread interests and the capability to exert military force far from its home territory. This has the advantage of focusing on dyads where the risk of conflict is highest. Politically relevant dyads represent only about 22 percent of all dyads in the 1885-1992 period, but nearly 87 percent of all disputes. Thus the risk of a dispute is about 24 times greater for a politically relevant dyad than for one labelled non-relevant. Of the disputes within non-relevant dyads, many are multilateral disputes involving an ally which is in a politically-relevant dyad with one or both. This chapter will report risk rates for politically-relevant dyads, partly because it avoids some analytical distortions when the dependent variable is a very rare event. The basic pattern of relative influence is similar for all dyads, though of course the risk factors are much lower using all dyads.

B. Risk factors. Following are the risks associated with various influences in one analysis (Russett and Oneal 2001). It gives the independent effect of each influence on the probability that an average dyad will experience a MID in any year, when the other influences are held constant. They are estimated using logistic regression analysis, a form of multiple regression analysis suitable for a binary dependent variable. The risks associated with the various influences should be interpreted cautiously, as models that drop or add variables, or measure them differently, will have somewhat different results. One example is that if geographical distance is not included, trade may appear to be positively related to conflict. That apparent effect, however, is spurious. Countries near to each other tend to have more disputes, and also to trade more—proximity facilitates both. But they do not have more militarized disputes *because* they trade; rather, if distance is controlled for, economically interdependent states experience fewer disputes. The presentation starts from empirical probability of about .06

that the baseline dyad would experience a militarized dispute in any given year. The baseline dyad is considered to be geographically contiguous, not-allied, and at the mean value for all the other variables, which are continuous. The probability changes are for when the value for each of the variables is changed, one at a time, to determine the independent effect of each. For alliance the value changes from 0 to 1, and for all the others it is increased by one standard deviation from the mean, allowing us to compare the relative effects of different influences on a standardized scale. This standardization enables us to consider the effect of changes that are plausible and substantively meaningful, neither trivial nor extreme. All the variables listed in the table are statistically very significant in the expected direction.

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1. Alliance. One of the most powerful predictors is an alliance, with allies 40 percent less likely to experience a MID than are non-allies. This is, however, somewhat exaggerated, since unlike for the continuous variables this change is over the entire range, 0 to 1. Also, remember the caution about causal interpretation for alliances: states may not be peaceful so much because they are allied as they are allied because they are already at peace with each other. Alliance may still help us estimate the relative risk, but does not necessarily represent an influence that can be manipulated to great causal effect.

2. Power ratio. Another powerful predictor is the power ratio. Changing the ratio of relative power between dyad members from an average ratio of about 6:1 by a standard deviation gives a power advantage to the larger country of over 26:1, which is associated with a 36 percent reduction in the probability of a dispute. This very great shift in military advantage is not one



than can readily be achieved by a country's leaders so it too, while valuable for prediction, does not easily translate into an effective political policy to reduce the risk of violence.

3. Democracy. If the value for democracy in the less democratic state of the dyad is increased from the average value (approximately 0 on a scale from +10 (most democratic) to -10 (most autocratic) by one standard deviation, the risk of a militarized dispute drops by about one-third. This corresponds to a shift on the democracy scale to approximately +7, which is the lowest point on the scale at which most scholars would characterize a country as really democratic. Most countries in contemporary Europe and Latin America would rate at least that high, and usually higher. Thus it represents a substantial but still plausible political transformation, less extreme than was experienced by the countries of Eastern Europe that went from a quite negative score to +7 or above after the collapse of communism. It makes no significant difference if the level of democracy in the more democratic country (the stronger link) is increased.

Some analysts claim that transitions from dictatorship to democracy are dangerous, and that democratizing states are more prone to involvement in militarized disputes (Mansfield and Snyder 1996). The evidence for this, however, has been much disputed. Using the information and analysis which produced the table, it appears more likely that the transition itself does not produce greater risk of violence, particularly if the transition is to a reasonably well-consolidated level of democracy (about +7). For such states the level of democracy achieved is sufficient to lower the risks of international violence, even if the transition is a recent one. While there may be some violence-inducing effects of partial transitions—to somewhere near the middle of the political scale--more complete transitions, whether from autocracy to democracy or from democracy to autocracy, make little difference to the risk of violence.

4. Economic interdependence. When the value of dyadic trade to gross domestic product is increased by one standard deviation for the less economically dependent state, the risk of a militarized dispute drops by 43 percent. This shift represents a large increment in trade, from less than .1 percent of the country's GDP to 1.2 percent. But it is not extreme. For example, in 1989 Soviet-American trade accounted for approximately .04 percent of the United States GDP, while trade between Belgium and the Netherlands amounted to about 6 percent of the Netherlands GDP. Contrary to some theoretical expectations, however, the effect of asymmetric dependence is minimal. Dyads comprising one big state and one small one (giving a very different share for mutual trade in the two) are neither more nor less prone to violence than are those comprised of two big states or two small ones.

Although it is not shown in the table, a generally open economy, as measured by the value of a country's trade with all other nations combined as a percentage of its GDP, also reduces the risk of a military conflict with all other states. An increase of one standard deviation in the size of the foreign trade sector in the less open economy (approximately doubling the size of the foreign trade sector) reduces the probability of a militarized dispute by 27 percent. (Because dyadic interdependence and general openness are somewhat correlated, the contribution of dyadic dependence drops to 35 percent when both measures are included in the analysis.) Contrary to some hypotheses, however, dyads which are asymmetrically dependent (for example, a small state heavily dependent on the mutual trade and one with a much bigger domestic economy and a wider range of trading partners) are no more prone to violence than are symmetric dyads.

5. International organization membership. The remaining conflict suppressor is joint membership in international organizations. Increasing the number of shared IGO memberships

by a standard deviation (from a mean of 31 to 51) brings a reduction in the probability of conflict of about 24 percent.

These are the results for the independent effect of any one variable when the others are kept constant. If, however, the values for each of three suppressor variables (democracy, interdependence, and IGO membership) are increased by a standard deviation, the probability of a militarized dispute drops by about 71 percent. Together, they make a very big difference, though they do not completely eliminate the risk of a dispute. And there has never been a war between two states with such high values on all three, or even two, of these suppressors.

6. Temporal stability. It is necessary to ask whether the patterns shown in the table have been substantially stable over time. For example, is the risk-reducing effect of democracy limited to the cold war era? The answer is no. The effect remains if one isolates the very few years of data for the post-cold war era, approximately 1989 through 1992. More importantly, it holds for the era between and including the two world wars, and back until roughly 1900. The effect was strong throughout the era of multipolarity in the international system as well as of bipolarity, and before the deployment of nuclear weapons for deterrence. No effect is apparent, however, in the years before 1900. The reasons are not entirely clear, but the more limited depth and scope of democracy in that century seems the most likely reason. If so, we can expect the risk-reducing effect of democracy to hold so long as democratic government is common and most citizens of a democracy have opportunities to affect their governments' policies.

Economic interdependence had a significant effect in reducing the risk of international violence throughout the entire 1885-1992 period, though its effect was strongest after 1950. Even before World War I when international organizations were few in number, for those states which did share memberships the risk-reducing effects were evident. Only during the League of

Nations era between the wars was there no systematic effect. And the violence-suppressing effects of alliances are limited to the post 1950 years. Otherwise, the risk-reducing effects of these suppressors for the dyads sharing them are reasonably constant. Because a greater proportion of the world's countries are now democratic than in earlier decades, and economic interdependence is stronger and more international organizations exist than in most previous years, one can say that the suppressors of violent international conflict now reduce the risk of international violence for a greater proportion of the world's population than ever before. This is consistent with the fact that there were only five international wars between 1990 and 2001, as compared with an average of eight per decade from 1950 to 1989.

7. Ethnic conflict. Ethnic differences—expressed in differences of race, religion, language, or culture—have been proposed as major inducements to violent conflict. Indeed, one major book (Huntington 1996) identifies a “clash of civilizations” as the major source of conflict in the late twentieth and twenty-first centuries. Analysis like that in the table above, however, finds little or no systematic evidence to support that hypothesis (Russett and Oneal 2001, ch. 7; Henderson and Tucker 2001 show similar results using war as the dependent variable). Using Huntington's characterization of countries by their civilization, in a simple regression in which dyads split between two civilizations are compared with dyads from the same civilization, the risk of a MID initially appears to be about 50 percent greater in the former. But when the full model specification is employed, including alliances, power ratio, democracy, economic interdependence, and IGO membership, all those variables are statistically significant in their customary pattern but the variable for split civilizations becomes insignificant. Nor is there evidence of a systematic increase in hostilities between states of different civilizations, or of particular hostility between Western countries and Islamic ones. Journalists may focus on such

examples, but when other known influences on the risk of violence are accounted for civilization differences exert no additional effect.

### C. Analytical problems and research directions.

1. The direction of causality. The assumption in the analyses reported above is that the absence of democracy, interdependence and other suppressors causes higher risk of international violence. But we noted that for alliance, in particular, this assumption is problematic. Countries may ally with each other because they are at peace, not vice versa. It is possible that causality also works in the opposite direction with other apparent suppressors. For example, military disputes between two countries may inhibit trade between them; countries may tend to join international organizations with countries with which they already have peaceful relations; countries may even find it easier to preserve democratic government in circumstances when they are not involved in numerous or serious militarized disputes with external adversaries. Each of these hypotheses is plausible, and there is some evidence for each. The analyses above addressed this problem in part by lagging the risk-reducing variables behind the year examined for disputes, to strengthen the plausibility of the causal claim. This temporal adjustment supports the theory and interpretation of a causal effect. The relationship assumed by the label suppressor appears to be at least as strong as, and probably stronger than, the reverse causal relationship. Nevertheless, more sophisticated causal modelling, using distributed lag analysis and simultaneous equations, are essential to better establish the direction and relative strength of these relationships.

2. Cross-temporal and cross-national variation. The analyses reported above, as is most of these endeavors, are pooled time-series analyses. That is, they simultaneously compute the effects of variation across dyads within the same year, and yearly for each dyad over the full

timespan. It is not clear whether we should expect the two to be very similar. If they were different, we could not draw the same predictions from both. That is, we might be able to say that as long as both states in a dyad remained democratic their risk of a militarized dispute would be about one-third lower than for an otherwise comparable dyad of states that were only at the mean level of democracy—but we could not so readily say that if members of an average dyad *became* democratic that would reduce their risk of conflict by a third. Fortunately this problem has received substantial recent attention, and the evidence seems to be that the inferences made from pooled time-series analysis remain essentially correct either across dyads or over time.

In addition to various recomputations on the large database, another useful check is by examining changes over time for dyads engaged in what are labelled enduring rivalries. One useful definition of enduring rivalry identifies dyads that have experienced six or more militarized disputes over a 20-year period. One can then treat each such dyad as a unit of analysis, and look at changes, for example, in the character of the members' political systems, and in the frequency of disputes both within the period of rivalry and before and after it. The evidence supports the inference that changes over time—increasing or decreasing democracy—do produce subsequent changes expected changes in the risk of militarized disputes (Diehl and Goertz 2000). Changes in political system, or in economic ties or other variables, can provide early warning of the risk of violence, and offer a plausible causal interpretation of the risk. This matter too, however, continues to require attention.

Pooled time-series analyses also are subject to limitations on the degree to which the observations are truly independent of one another. Analogizing from medical epidemiology, one problem is contagion: violence in one dyad can make violence in other dyads more likely—

especially those with countries that are geographically, politically, or economically linked to one or both members of the dyad. Another is re-infection, since the occurrence of a militarized dispute in a dyad in one year is often associated with the occurrence of a new dispute in subsequent years, as with enduring rivalries. In terms simply of prediction, knowing the past record of disputes is valuable. For causal explanation, however, the situation may be less clear. Is the occurrence of a new dispute caused by the previous dispute, or is it instead caused by the same inducements and lack of suppressors that caused the previous one? Fortunately, researchers are sensitive to these issues and now customarily apply statistical corrections. The statistical methods, however, continue to evolve and the standards for evaluation become ever more rigorous.

#### IV. CIVIL WARS

The prediction and understanding of the causes of violence between countries is probably more advanced than that for violence within countries. It has received somewhat more attention, and the information base available for analysis is larger. Nevertheless, civil wars and other major violence within countries have, especially since 1990, become more common than wars or major violence between countries. From 1989 to 2000, for example, purely intrastate conflicts with 25 or more battle-related deaths per year outnumbered international ones (including intrastate conflicts experiencing foreign intervention) by a ratio of 6:1. The incidence of civil wars has, however, declined from its peak in the early 1990s (Wallensteen and Sollenberg 2001).

A. Analytical issues. The causal structure underlying civil wars is not likely to be the same as for international violence, since the former are fought over control of the state apparatus whereas in international conflicts there is no super-ordinate authority to be seized or feared. Still, many of the inducements or suppressors to civil violence are similar to those for

international violence. This review is limited to organized civil violence between two parties, at least one of which is the government.

A difficulty in predicting and explaining civil violence and civil wars is that the information base is smaller. The unit of analysis is the country-year (rather than, for international conflict, the dyad-year, which gives a much larger number of observations). The quantity and quality of information on low-level conflicts is much less satisfactory than for more intense ones, so the focus is on wars (typically defined as more than 1,000 or war-related deaths, including 1,000 in at least one year and 200 deaths per year in other years) rather than on spatially and temporally restricted insurgencies or disputes. Also for reasons of information, most analyses do not begin with events earlier than 1945. Thus the database does not exceed 7,000 observations, with fewer than 150 civil wars and 800 war-years. This suffices to permit good multivariate analyses, which are becoming numerous; nonetheless wars and even war-years constitute rare events.

One may wish to understand the initiation, continuation, or cessation of civil war, and its severity in numbers of immediate and long-term casualties. As with international conflicts, the influences affecting the initiation of civil war are not necessarily the same as those affecting continuation or intensity. This review concentrates on the initiation of wars, with some comments about continuation and cessation. It also makes a distinction between wars where differences in ethnic identity are central to the conflict, and other (revolutionary) wars in which they are not. Approximately 70 percent of civil wars have been characterized as ethnic wars (Sambanis 2001); the two kinds may have different causes.

B. Inducements and suppressors. Of the possible inducements to war, size and terrain of the country make a difference. States with larger populations are likely to have more potentially-



disaffected groups able to mount a war effort. A rugged and sparsely populated terrain makes it easier to sustain a major dissident group in war, as does the availability of “lootable” natural resources like gold, diamonds, drugs or other high-value commodities (Collier and Hoeffler 2000). All dissident groups must contend with the disincentives to collective action. Combat is dangerous, and most individuals will not inherently be highly motivated. Lootable resources offer both the means for purchasing war material and for rewarding fighters. This is more important in non-ethnic wars than in ethnic ones. In the latter, loyalty to the group and peer-pressures may provide the necessary motivation. If lootable resources are sparse, the availability of external assistance to the rebels can often be critical to the incentives to initiate and continue a war.

The initial level of economic development, and possibly the rate of economic growth, is certainly important. A wealthy or at least developing economy raises the opportunity costs of violence: employment opportunities are better and governments are likely to have more resources with which to satisfy discontented elements of the population. Whereas some analyses find that a low rate of economic growth contributes to the likelihood of civil war, a low level of development seems the more robust inducement (Collier and Hoeffler 2002, Sambanis 2001, Elbadawi and Sambanis 2002).

Ethnic heterogeneity may either induce or suppress conflict, and is especially important in the conditions of discrimination associated with the incidence of ethnic wars. Some evidence shows that the likelihood of war is not a linear function of the degree of heterogeneity. Ethnically polarized societies—containing two large and distinct groups—may be the most war prone. In quite homogenous societies, as in highly fragmented states, small minorities may

suffer from the collective action problems in organizing and sustaining a war, and the unfavorable power ratio makes armed challenge to the majority too dangerous.

Political system type also matters, especially for ethnic wars since lack of democratic rights can threaten the core of ethnic identity and reduce the possibility for a redress of grievances (Gurr 2000). Civil wars are more likely to break out in countries that are between the extremes of full democracy and autocracy (Hegre et al. 2001). As with international conflicts, this effect in the middle of the political scale is not necessarily a matter of states being in transition from one form of government to another. Rather, it results on the one end from the willingness and ability of strong autocratic regimes to suppress dissent, and on the other end the readiness and ability of strongly democratic regimes to recognize group and individual rights and so lower the level of grievance. Once a war has broken out, type of political system is less relevant to whether it continues. Having one or more democratic states as a neighbor, however, seems to help prevent wars through providing the possibility of external mediation and good offices. By contrast, if a neighboring state is experiencing a civil war, that war is likely to spill over into related ethnic groups in adjacent countries.

C. Ending civil wars. Many civil wars continue for long periods, or re-ignite after periods of relative peace. As with MIDs, a past history of conflict matters. Countries that have experienced a civil war are 50 percent more likely than other states to have another one within the next five years. The longer a country stays at peace the lower the risk of war recurrence. One important element in predicting violence, therefore, is how the initial violence ended. External military interventions usually fail, and often simply lengthen the war. Such interventions in favor of the government succeed about half the time; to do so they must be short, against not much domestic opposition. Interventions in favor of the rebels fail at a ratio of about

1:7 (Regan 2000). Partitioning a country into two or more independent countries is a possibility, but since what was once a civil war can be reborn as an international one, the advisability of partition as a means to end violence is questionable.

The best means to prevent a subsequent outbreak of violence is to produce a stable and institutionalized settlement built on political reform, elections, and democratization. To do this is not easy, and a country needs a lot of resources, from within and or from outside. The probability of achieving such a solution rises markedly with the level of economic development (an increase of about 4:1 moving from the top of the lowest quartile in development to the bottom of the highest quartile in development). It is several times higher if the number of warring factions is only two rather than four or more, which greatly complicates the process of negotiation and settlement. It is about eight times higher if the war ends with both a formal peace agreement and a multidimensional United Nations peacekeeping operation than if neither of these supports is present. This kind of UN operation, furthermore, is not just a military intervention, but one with the resources able to provide economic reconstruction, institutional reform, and election oversight than with neither of those supports. The chance of a stable solution is much lower, however, if the war has exacted many deaths and displaced many refugees. The probability of achieving a stable institutionalized peace is about .5 (lower for wars of ethnic identity) for countries in which the total of deaths and displacements was at the top of the lowest quartile but drops to near-zero for those at the bottom of the highest quartile (Doyle and Sambanis 2000).

## V. CONCLUSION

The study of organized violence, for prediction, explanation, prevention, and remediation, has made great strides in recent years, thanks to major advances in theory, in methodological

sophistication, and in the quality and quantity of information readily available in electronic databases. A critical mass of researchers now exists, and further advances in all dimensions can be expected as these advances complement one another. This applies both to international violence and to violence within countries. Risk factors are being established with some confidence. They include influences which induce violence, and may be difficult to change (such as geographic location, relative power, and ethnic tensions). But they also include a range of suppressors which are more subject to government policy (such as democratic institutions, economic growth and interdependence, and the activities of international organizations).

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**Percentage Change in Risk for a Dyad's Annual Involvement in a Militarized Dispute,  
1886-1992**

*All variables at baseline values except:*

Allies equals 1	-40%
Power ratio increased by one standard deviation	-36%
Lower democracy score increased by one standard deviation	-33%
Lower interdependence score increased by one standard deviation	-43%
Joint IGO memberships increased by one standard deviation	-24%
Democracy, interdependence, and IGO scores all increased by one standard deviation	-71%

All variables are statistically significant at the  $p < .001$  level.

Source: Russett and Oneal 2001, 171.