## PROGRAMMING FOR PEACE

## Advances in Group Decision and Negotiation

Volume 2

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# Programming for Peace

## Computer-Aided Methods for International Conflict Resolution and Prevention

Edited by

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## Preface

From its beginning in the fifties of the last century, Artificial Intelligence was heavily supported by "defence agencies" in order to make "better warfare".

But, if an AI researchers assumes that her/his discipline really can deliver results—otherwise s/he would be a dishonest researcher—then why not try to use it to help decision-makers in government or concerned groups outside government who want to prevent the outbreak of war or want to end it?

Therefore, already in the eighties, the Austrian Research Institute for Artificial Intelligence (OFAI), often in cooperation with the then Department of Medical Cybernetics and Artificial Intelligence of the University of Vienna, tried to use AI methods first on a more conceptual base but then increasingly by using conflict-, crisis- and conflict management-databases to either find, by case-based reasoning methods, similar cases in order to see which conflict management methods were successful or by computing decision trees with machine learning methods to find the conflict management strategy with the greatest chance of success in a new crisis situation (for more information, please see Chapter 11 and its references).

Our research efforts were supported both by the Jubilee Fund of the Austrian National Bank and by the Austrian Federal Ministry of Science and Research / Science, Research and Culture / Science and Transport / Education, Science, and Culture (the same Ministry but with, successively, four different names). The Ministry opened, in 2000, a tender for research projects for "Promoting Peace and Preventing Violence". 22 project proposals were submitted, an international jury selected 3, and we were happy to be among those chosen.

This project enabled us to organize a two-day workshop to which we could invite leading scientists from countries all over the world, to present and discuss their recent results. The participants of the workshop concluded that the interesting discussion papers, elaborated by the authors and enriched by contributions of scientists who were not able to participate, would be of interest and of use to a larger audience. This volume is the result of this endeavour. I therefore want first to thank the authors who took great pains to enhance their original position papers to book chapters by including new material and by considering the comments in and outside the discussions.

Second, I want to thank the successive Federal Ministers in charge, namely Heinz Fischer, Erhard Busek, Caspar Einem and Elisabeth Gehrer, and the very helpful state officers in their Ministry, especially Sigurd Höllinger, Ilse König and Christine Lutter.

Third, I want to thank Dan Druckman who established the contact to Mel Shakun, the editor of the series "Advances in Group Decision and Negotiation" at Kluwer Academic Publishers, now Springer, and Mel Shakun himself for accepting this book in his series.

Welmoed Spahr and Marianna Pascale of Springer were always very cooperative partners.

Fourth, my thanks go to Isabella Ghobrial-Willmann and Ulrike Schulz for their help in the organization of the Workshop and their very useful secretarial help.

I am especially indebted to Sabine Payr: she not only laboriously converted all submitted chapter manuscripts to the formatted camera-ready book manuscript and prepared the two indices, she also diligently improved the English of the contributions wherever necessary. And the title of this book is also her creation. I look forward with pleasure to future joint endeavours.

Finally, I want to thank the Austrian taxpayers whose money enabled us to work as a group for two years, to enlarge the Confman database with conflict management attempts in the years 1995 to 2000, to pay for the travel and hotel expenses of the participants of the Workshop, and finally to prepare this volume.

It is my sincere hope that this volume can contribute, at least a little bit, to reduce the suffering of humans.

ROBERT TRAPPL

Chapter 1

## Introduction

Robert Trappl

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"Even by the standards of war, some of the atrocities in eastern Congo are shocking. Zainabo Alfani, for example, was stopped by men in uniform on a road in Ituri last year. She and 13 other women were ordered to strip, to see if they had long vaginal lips, which the gunmen believed would have magical properties. The 13 others did not, and were killed on the spot. Zainabo did. The gunmen cut them off and then gangraped her. Then they cooked and ate her two daughters in front of her. They also ate chunks of Zainabo's flesh. She escaped, but had contracted HIV. She told her story to the UN in February, and died in March."

-© The Economist Newspaper Limited, London (June 11th, 2005).

After reading this passage from a recent issue of The Economist, can one go back to "normal"? Not easily. And even if one thinks that the research on computer-aided methods for conflict resolution and prevention can only contribute a tiny bit to help preventing such horrible events, one has to work on that. The more so as there are already programs available which calculate the risk of losses for a potential aggressor, e.g. the Tactical, Numerical, Deterministic Model (TNDM), developed by the Dupuy Institute (<u>http://www.dupuyinstitute.org/tndm.htm</u>, last checked 23 Sept 2005); even though programs of this kind sometimes may encourage an intervention in an unjust war.

But "Programming for Peace" should not mean "peace at any price". It even could mean "war" in order to establish "long-term peace". The title invites misinterpretation. But, to take a historic example, (nearly) all Europeans wholeheartedly welcomed the decision of the USA to enter the war against Hitler's Germany and its allies.

Researchers of international relations soon became aware of the potential of computers for their work. Already in the Eighties of the last century data sets were compiled, such as the Correlates of War (COW) by David Singer (e.g. Leng, 1987), focusing on 30 crises selected from the 1915-1975 period, or the World Events Interaction Survey (WEIS, Schrodt, 1991). But also in Europe, in Germany, to be precise, the *Arbeitsgemeinschaft für Kriegsursa*-

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*chenforschung (AKUF)* compiled a database covering "all martial conflicts" between 1944 and 1984 (AKUF, 1987).

For the analysis, Mallery (1988) and Alker et al. (1991) attempted to use natural language processing methods to create semantic networks ("text models") from texts related to political problem solving (the RELATUS project). Thorson and Sylvan (1982) and Anderson and Thorson (1982) described an interactive cognitive model that supported counterfactual simulation of President Kennedy's decision process during the Cuban Missile Crisis.

UNCLESAM (Job and Johnson, 1991) was a rule-based simulation of the US decsion-making regarding the Dominican Republic between 1961 and 1965. Another study focused on the analysis of responses of the Soviet Union to crises in Eastern Europe, specifically the "Czechoslovakian Crisis" of 1968 (Mefford, 1986). His program matched histories against cases to assemble composite precedents representing courses of action leading from the present into the future. In this area of the Cold War also specific Artificial Intelligence projects were proposed, in order to reduce the likelihood of having a "hot" war: the joint development, i.e. by scientists both of the USA and the USSR of an intercultural knowledge base, an English-Russian/Russian-English translation program, and a crisis handling expert system (Trappl, 1986).

A more detailed overview of the research in this time period can be found in Trappl and Miksch (1991), an edited volume of contributions from leading researchers in Hudson (1991).

Present-day computers allow for the development of larger databases with much more variables, sometimes with automated updates, statistical analyses of far higher complexity, elaborate simulation models, and even interactive uses of these databases. It may, sometimes, be of interest to investigate why some complex methods, developed and/or applied in the Eighties, were phased out and others entered the scientific arena. An overview of current research can often be found in the special issues of the *Journal of Conflict Resolution*, and a comparison of different research methodologies for studying conflict in international relations is given in the book by Maoz et al. (2004).

This volume, however, is focused on one specific task: the study and application of computer-aided methods for international conflict resolution and prevention. Since conflicts are a world-wide phenomenon, the majority of the contributors to this volume still come from the USA—no wonder!—but also scientists from Austria, Canada, Germany, New Zealand and Switzerland have contributed.

This volume is structured into three parts according to only slightly overlaping categories:

- Part I: the collection of information or the development of databases and their analyses by statistical means,
- Part II: the application of complex analytical methods like wavelet analysis, hidden Markov models, multi-layer perceptrons, self-organizing maps, decision trees, case-based reasoning, and rule learning,
- Part III: complex theoretical studies but with a strong application component.

All of the contributions are aiming at preventing or ending conflicts.

#### Part I

In chapter 2, "Conflict Resolution by Democracies and Dictatorships: Are Democracies Better in Resolving Conflicts?", Frank R. Pfetsch computes, among others, using the KOSIMO database developed under his guidance, a ranking of 162 individual countries with regard to their endangerment, security, and potential to resolve conflicts, with the result that democracies rank distinctly higher in the resolution index than dictatorships. The much smaller number of violent conflicts of democracies compared to autocracies and compared to the total sum of conflicts indicates that democracies can resolve conflicts better. This is also valid for belligerent encounters. The calculations also show which states are especially endangered and which are specially secure.

In chapter 3, "Trade Liberalization and Political Instability in Developing Countries", Margit Bussmann and colleagues study, in a dataset of 90 developing countries for the time period 1978-1997, whether free trade reduces the risk of political instability and whether the process of liberalization increases this risk. With regard to political violence, free trade has a conflict reducing effect in the long term—but no effect in the short term. Furthermore, the suspicion that countries on their way to a more open economy are more susceptible to instability cannot be supported. Their results suggest, among others, that free trade has a conflict-reducing effect especially for political violence. The results are supplementary to the findings of the liberal peace on the interstate level.

In chapter 4, "Computer Assisted Early Warning—the FAST Example", Heinz Krummenacher introduces the political early warning system FAST. FAST is a German acronym which stands for early analysis of tensions and fact-finding. This system aims at enhancing political decision makers' ability to identify critical developments in a timely manner so that political strategies can be formulated to either prevent or limit destructive effects of violent conflicts or identify windows of opportunity for peace building. FAST combines field investigation by annual fact finding missions, a weekly event data analysis and a daily qualitative analysis, i.e. constant monitoring, with permanent external expertise by an expert network.

In chapter 5, "Country Indicators for Foreign Policy: Developing an Indicators-Based User Friendly Risk Assessment and Early Warning Capability", David Carment and colleagues present this project, acronym "CIFP" as an ongoing effort to identify and assemble statistical information conveying the key-features of the political, economic, social and cultural environment of countries around the world. The data provides at-a-glance global overviews, issue-based perspectives and country performance measures. The foundation of CIFP methodology is the use of structural indicator analysis of latent conflict potential.

In chapter 6, "The Confman.2002 Data Set: Developing Cases and Indices of Conflict Management to Predict Conflict Resolution", Jacob Bercovitch and Robert Trappl present this dataset which was initiated at the University of Canterbury under the direction of the first author in the mid-1980ies. The main concern has been to provide a comprehensive, chronological account of international conflict between 1945 and 2000 and to shed some light on its occurrence and management. The international conflict management dataset is an extension of this work and focuses on the conditions that make international mediation and negotiation successful and on the application of sophisticated data-analysis methods to identify and predict conditions of conflict management. In this chapter an operational definition of conflict management as such, are introduced. Furthermore, the many results of statistical analysis are presented.

## Part II

In chapter 7, "Events, Patterns, and Analysis: Forecasting International Conflict in the Twenty-First Century", Devika Subramanian and Richard J. Stoll stress at first the importance of anticipating conflict: if conflicts cannot be anticipated, what chance do we have to prevent or stop them? They propose a research project to improve the ability to anticipate serious international conflict by using a combination of online media sources, analytic techniques and knowledge derived from research in international conflict. After a thorough theoretical analysis of the topic the authors focus on the primary building block of their research, the event, and they propose to automate the extraction process from media sources. In their research they will pursue two paths of analysis: the first will involve attempting to predict the onset of serious international conflict strictly from patterns in previous events. The second path will involve building models that will increase the understanding of the process by which conflicts escalate. As an exploratory task, they chose the ebb and flow of the Cold War, in the period 1966-1978, and analyze human-coded data with a wavelet, the result being a high correspondence to historic key events in this period.

In chapter 8, "Forecasting Conflict in the Balkans Using Hidden Markov Models", Philip A. Schrodt attempts to forecast conflicts in former Yugoslavia for the period January 1991 to January 1999 by using political and military events reported in the lead sentences of Reuters news service stories. These sentences were coded into the World Events Interaction Survey (WEIS) event data scheme. The forecasting scheme involves randomly selecting eight 100-event "templates" taken at 1-, 3-, or 6-month forecasting lags for high-conflict and low-conflict weeks. A seperate HMM is developed for the high-conflict-week sequences and the low-conflict-week sequences. Forecasting is done by determining whether a sequence of observed events fits the high-conflict or low-conflict model with higher probability. The author describes the outcome of his experiments, summarizing that, among others, it is possible to use models with substantially fewer parameters without markedly decreasing the accuracy of the predictions; in fact, predictions of the high-conflict periods actually increase in accuracy quite substantially.

In chapter 9, "Analyzing International Conflict Management by Neural Computation", Georg Dorffner and colleagues report about the application of pattern recognition methods from the area of neural computation exploring their capabilities for finding structure in the CONFMAN database. Two methods were tested, namely, so-called Multi-layer Perceptrons (MLPs), nonlinear classifiers, and so-called Self-organizing Maps (SOMs), a clustering and visualization method. A thorough analysis of this non-linear classification revealed only minor differences as compared to linear classifiers, yet classification performance significantly above chance could be reached. Self-organizing Maps revealed clusters and substructure in the data. In a third exploration it could be shown with these methods that there are significant differences in the two subsets 1945-1989 and 1990-2000; conflict management outcome is also more predictable after 1989 using an MLP.

In chapter 10, "Modeling International Negotiation: Statistical and Machine Learning Approaches", Daniel Druckman and colleagues study the question of which factor(s) is(are) the best predictor(s) or discriminator(s) of the outcome in an international negotiation. In this chapter statistical findings, primarily correlation analyses, were compared with two types of machine learning approaches, decision trees and rule learning. The analyses were conducted on a dataset of 42 cases where each case was coded in terms of 16 features and in the 5 categories of international negotiation objectives. Comparing the results, the authors conclude that the combined approaches of

statistical and machine learning analyses yield a larger picture of what is happening in negotiations.

In chapter 11, "Machine Learning Methods for Better Understanding, Resolving, and Preventing International Conflicts", Robert Trappl and colleagues want to answer the question if it is possible to aid decision makers or their advisers who want to prevent the outbreak of hostilities/wars or to end them through negotiations or mediation, by giving them recommendations as the result of applying artificial intelligence, especially machine learning methods, to existing war/crisis/mediation databases. Using the CONFMAN database, they start with showing a decision tree, presenting the most important factors for successful outcome of a conflict management attempt. By differentiating between the cases before and in 1989 and the ones in 1990 and after-in 1989 the fall of the Berlin Wall marking the transition from two superpowers to one-they obtain a decision tree with better prediction accuracy than the overall one. Computing decision trees for different world regions shows that some of these trees have an even higher predictive value. Furthermore, two interfaces are presented which were developed by the authors in order to enable decision makers to find out cases similar to a given crisis situation, for the purpose of either investigating which conflict management methods are most likely to be successful, or helping to assess the risk of its escalation in order to more efficiently prepare humanitarian aid.

#### Part III

In chapter 12, "New Methods for Conflict Data", Will Lowe explores some of the methods international relations researchers apply to event data and to conflict databases. Probabilistic reformulations and developments are proposed for their improvement. State space models should allow more realistic models to be fitted to event data and probabilistic expert systems should extend the range of theories testable with conflict databases.

In chapter 13, "Information, Power, and War", William Reed employs a simple ultimatum game of bargaining to evaluate two traditional power-centric theories of world politics, balance of power and power transition theory. The formal and empirical analyses demonstrate that as states approach power parity, information asymmetries are greatest, thus enhancing the probability of militarized conflict. Uncertainty is a central cause of conflict emergence and is correlated with the distribution of observable capabilities. Recognizing the relationship between the distribution of power and uncertainty offers a more sophisticated interpretation of power-centric explanation of world politics.

In chapter 14, "Modeling Effects of Emotion and Personality on Political Decision-Making. Application to International Conflict Prevention and Reso-

lution", Eva Hudlicka describes a generic methodology for representing the effects of multiple interacting emotional states and personality traits on decision making and an associated computational cognitive architecture which implements this methodology. She presents results of an evaluation experiment that demonstrates the architecture's ability to model individual tactical decision-making and to produce observable differences resulting from distinct individual profiles. She then discusses how the methodology and architecture could be extended to model strategic, political decision making, and how it could support a variety of activities geared towards international conflict prevention and resolution. She concludes with specific theoretical and pragmatic challenges associated with this approach to computer-aided conflict prevention and resolution.

In chapter 15, "Peacemaker 2020: A System for Global Conflict Analysis and Resolution; A Work of Fiction and A Research Challenge" Kirstie Bellman uses the approach of designing a complex system by starting with a solution and working backwards. Her story takes place in the year 2050, when a lecture is given about the analyses of 30 years of performance of the Peacemaker System 2020. She continues with the discussion of the technology and the issues underlying the system, especially pervasive computing, sophisticated "de-Babeling", new database construction and analytic techniques. Role-playing simulation, social worlds and story logics as a fundamental key to analyses could be three new issues for peacefare.

This chapter of Kirstie Bellmann would be a perfect conclusion of this volume if it were not that the important current threat, terrorism, was not treated in any of the chapters. Therefore one more, short chapter was added.

In chapter 16, "Concluding Remarks: And Terrorism?", Robert Trappl shows first why the standard databases in international relations are of hardly any use with respect to terrorism and briefly gives three examples of databases developed for terroristic events. He furthermore presents examples of computer-aided methods applied to those databases, namely the analysis by time-series and modeling networks of terroristic groups in order to find better means for their destabilization.

The final remark in Kirstie Bellmann's chapter is the best conclusion for this introduction:

"Hopefully, this paper and its companion papers in this volume will start the discussion towards both experimentation and experience in Peacefare."

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PART I

Chapter 2

## **Conflict Resolution by Democracies and Dictatorships: Are Democracies Better in Resolving Conflicts?**

Frank R. Pfetsch University of Heidelberg, Germany

The chapter deals with the capacities of various regimes to master conflicts. Does the regime character make a difference? Are democratic regimes better in resolving conflicts than autocratic or transitory regimes? The study draws from a wide range of indicators for the independent variables 'challenges' and 'support' (both are put together in order of ranking with indices as to their management capacities) for each existing state. Besides these explanatory factors, regime factors are calculated independently. The dependent variable 'conflict' draws on the data set Kosimo in two ways: first, with the number of conflicts occurring between 1945 and 2000; and second, with the weighted number of internal and neighboring conflicts only. These conflicts are then confronted with the management capacities of each state. Cross-calculations show that, not surprisingly, on the whole democracies have had a better record in the management of conflicts than other regimes.

## 1 INTRODUCTION: FORMULATION OF THE PROBLEM

The discussion about the so-called 'democratic peace' has been going on for some decades.<sup>1</sup> What is at stake is not the observation that democracies are not going to war against democracies. The 'democratic peace' comes "as close as anything we have to an empirical law in international relations" (among many others Levy, 1988: 662; Bremer, 1992; Maoz and Russett, 1993; Gleditsch and Hegre, 1997; Raknerud and Hegre, 1997). The discussion concentrates rather on the theoretical foundation of that "law".<sup>2</sup>

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<sup>&</sup>lt;sup>1.</sup> Foremost in the journals Journal of Peace Research, International Security, Zeitschrift für Internationale Beziehungen, and Journal of Conflict Resolution.

<sup>11</sup> 

Three approaches can be distinguished in this debate: one position holds that internal factors cause democratic behavior (Mousseau and Shi, 1999). Realists (among others Layne, 1994; Russett et al., 1995) put forward external factors that cause such behavior. A third position states that both internal and external factors equally cause peace between democracies (Czempiel, 1996). According to a variant of this position the international environment is responsible not per se but through democratic institutions (Moravcsik, 1998; Randall and Peceny, 2002).

In these camps differentiations are being proposed: on the domestic side, structural factors such as parliaments, checks and balances, public opinions, elites (Owen, 1994; Russett et al.,1995) or the media (van Belle, 1997) are responsible for the peaceful behavior, and on the normative side factors such as culture, democratic values or the media (Layne, 1994; van Belle 1997) are mentioned.

As to the external factors, studies related to the following themes have been made: the perception of states of each other (Owen, 1994), the disposition towards military interventions (Kegley and Hermann, 1996; Tures, 2001), the diffusion of democracy through democracies (Randall and Peceny, 2002). Does the intensity of trade relations between states guarantee peace? (Gowa, 1994; Mansfield, 1994; Hegre, 2000). What is the role of the power status, of alliances and international regimes or of the existence of a hegemon (Weede, 1983; Bremer, 1993; Maoz and Russett, 1993; Henderson, 2002)? Are existing power constellations and their perception of any importance (Owen, 1994)? In these debates, realists and liberalists confront each other. The realists question the 'democratic peace' approach by stressing anarchy, competition and self-help instead.

Some authors look at the relationships between internal and external factors: external threats tend to lead to authoritarian structures (Hintze, 1975; Baade, 1962); some argue that external crises do not change democratic structures (Mousseau and Shi, 1999). Another area of concern is the adequacy of Kant's propositions in his philosophical sketch "Zum ewigen Frieden" (Layne, 1994; Robinson, 2001; Randall and Peceny, 2002).

As against these studies, my investigation proposes the following steps of inquiry:

*First*, we deal with the *explanandum*, i.e. the conflicts that have occurred during the fifty years of the second half of the  $20^{\text{th}}$  century; this investigation

<sup>2.</sup> Some other formulations read as follows: Democracies do not start wars against each other; democratic nations are rarely, if ever, on opposite sides in wars, democracies join other democracies in case they are at war (Hegre, 1997). "Democratic dyads are far more peaceful than non-democratic and mixed dyads" (van Belle, 1997: 405). However, democracies are on the whole not more peaceful than other regimes; most of the wars after World War II have been fought by democracies but not against one another.

is based on a very broad information base on conflicts including violent as well as non-violent, internal as well as external behavior.

*Secondly*, this article suggests that the *explanans* for observable conflict behavior is the result of the difference between potential threat and potential support of states: a country's insecurity/endangerment and security/support as well as—deduced from this—its ability to resolve conflicts (empowerment) are operationalized and transformed into measurable quantities. It is the empowerment and governance capability that explains success in conflict management. As a result, countries are ranked according to their specific threat and security index.

*Thirdly*, the data base on regimes is rather comprehensive and is calculated independently of the measures mentioned before; it allows the identification of countries according to their regimes. As a final result, I present a list which ranks most of the countries of the world according to their specific capabilities to deal with conflicts in order to identify the regimes that are better equipped to settle conflicts. At the same time, the index serves to identify specifically endangered states and, through pointing out the supporting factors, to discuss the possibilities of non-violent ways to resolve conflicts.

This chapter takes into account the above mentioned studies about internal and external determinants and tries to combine these approaches and to test them against a broad range of conflicts that have occurred during the fifty years since 1950. Which states can best handle conflicts and which have a greater capacity to resolve them? Does the character of the regime (democratic, transitory, or autocratic) and the quality of governance make a difference in resolving conflicts?

#### 2 THE MODEL

The *explanandum*, resolving conflicts, is the result of institutional realities (structural level) and political capabilities (operational level) of states and constellations of states (*explanans*). The action of a government is seen as dependent on three determining factors: the conflict-generating factors, the oppositely working conflict-mitigating factors and, additionally, the regime factors.

The basic model assumes that actions of governments depend on three groups of factors: firstly, governments have to master demands, challenges/ endangerments or risks<sup>3</sup>. These factors indicate the insecurity of a country. Secondly, governments, as a response, receive support, legitimation and

<sup>&</sup>lt;sup>3.</sup> I use these terms as interchangeable.



Figure 2.1. Dynamic phase model

capacities to act. These factors indicate the security. Thirdly, and in addition, the character of the regime also determines its ability to manage conflicts. The discrepancy between endangerment/challenge-indicating factors and support-indicating factors reflects the freedom of action of a given government. If a regime is confronted with a challenge leading to a conflict, then the conflict develops violently or non-violently according to the regime's action and/or reaction. The way a regime handles a conflict depends on its capacity to dynamically process the conflict, on the management (governance) of it, on the issue involved and on the actions of the opposing side, etc.

## 3 CONFLICT-PROMOTING AND CONFLICT-MITIGATING FACTORS

The theoretical literature mentions numerous factors of individual actors, society, state and behavior between states that could lead to peace-endangering situations. I will list here some important theoretical approaches that can be found in the literature on the history of ideas:

As factors that *endanger peace* the following can be found in the literature: fear, threat, ambition of rulers and non-ruling elites, power politics, the calculus of power, power rivalry, misperceptions, aggression, fanaticism, ideology, belief of a conspiracy, autistic behavior, military ambition (militarism), proliferation of (nuclear) weapons, escalation of conflicts through rivalry (security dilemma), interests of a power cartel, so-called 'rogue states' (weak states, absence of centrally effective and responsive institutions), increase of the number of states on a global scale, collapse of systems and regimes, imbalanced development of states, economic interests (access to raw materials and sales markets), expansive ideologies (fascism, communism), proximity of countries to one another (contiguous countries), fragmentation, segmentation, discrimination (nationalities, minorities, and ethnic and religious groups), economic inequality, exhaustion of resources, and finally the character of a regime (dictatorship).

As *peacekeeping factors*, the literature mentions the perception of security (no threat), cooperative strategies in negotiating conflicts, open foreign politics without aggressive intentions, calculated restraint in the use of weapons (politics of deterrence), disarmament, end of territorial expansion, social justice, free commerce, geographic distance, international organizations, alliances, integrated regimes, actions of non-governmental organizations, good conflict management, balance of powers, the existence of a hegemonic power, good governance, codification and suability of human and civil rights, world opinion (international forums, media, so-called 'CNN factor'), and finally the character of the regime ('democratic peace'). (Pfetsch, 1994: 255f.)

From this unqualified list of factors, I have chosen those which allow for operationalization and transformation into measurable quantities. I assume that, by this, I capture the most relevant factors. The dynamic model can serve as orientation for the interdependence of actions and effects, and for logical argumentations respectively.

#### 4 STATES

The goal of my study is to present data on every state (non-state actors are not considered in this analysis) in the form of an index which makes possible the creation of a ranking of states according to the degree of endangerment, security and susceptibility to conflicts, as well as their ability to resolve conflicts. Which states are the most endangered and which states enjoy security?

All states with available data<sup>4</sup> and of a certain size (having a population of at least 500,000) were included. According to these criteria, there are at least

<sup>&</sup>lt;sup>4.</sup> When establishing the list of states and their regime type the following has to be taken into consideration: The number of states has not remained stable in the course of fifty years. There are many states that were added after their independence. There are states that have changed their economic potential and political regime. Some states have been newly created after larger units have dissolved (Yugoslavia, USSR, Pakistan, Ethiopia, Czechoslovakia; UAR, etc.) or through unification (Germany, Yemen, Vietnam, Tanzania), and some have remained divided (North and South Korea). Some states have changed their names (Rhodesia now Zimbabwe, Burma now Myanmar, Zaire now Congo, Dahomey now Benin, Upper Volta now Burkina-Faso) or carry different names in different languages (White Russia or Belarus). Finally, there are areas that are not at all or only partly recognized by the world community (West Sahara, Northern Cyprus).

30 states that did not enter the calculations, leaving 162 states. The states were divided into three regime categories: democratic, transitory and autocratic regimes. Transitory ones can, in some cases, be understood as a residual factor.

I have tried to accommodate changes by forming a time series of decades for the most important indicators. In this way, one can see how many types of regimes predominantly existed within the different decades, and how many conflicts appeared and with what intensity.

Independently from the previously considered index calculation, the states are now defined according to their regime character. Therefore, an array of quantitative and qualitative studies is taken into account each of which emphasizes various criteria for political regimes. The criteria mentioned most often for democratic regimes are the following:

- All political power emanates from the people and remains in its control (participation).
- Those who exercise power are duty-bound to present to the voters their programs and leadership (openness of the selection process).
- Elections are to be held under competitive conditions between at least two parties (competition in elections).
- Political parties must be democratic in their structure and must be led as voluntary organizations and not as instruments of the government.
- Individual rights and fundamental freedoms must be guaranteed (political and civil liberties).
- Public opinion is not allowed to be unilaterally determined through the manipulation by the government (civilian division of powers).
- Rule of law must be recognized.
- The power of the political center must be constitutionally limited and controlled (limitation of power, division of powers) (Pfetsch, 1985: 176; Beetham, 1995; Dahl, 1999; Schmidt, 2000).

Three quantitative studies on democracy (Vanhanen, 1984, 1990, 1997; Freedom House, 2001; Polity IV: Marshall and Jaggers, 2000) take into account the most important characteristics of such an understanding of democracy, e.g. competition, participation, the guarantee of civil and political individual rights and fundamental freedoms as well as the limitation of power.

The Finnish researcher on democracy Tatu Vanhanen (Vanhanen, 1984, 1997) chose two variables for his index of democracy (D-Index), namely competition and participation.<sup>5</sup> In addition and as a correction to this simple democracy index the more normative approach by Freedom House on politi-

cal rights (PR) and civil liberties (CL) should be included.<sup>6</sup> As a third and more reliable study, I draw on the Polity IV Project by Monty G. Marshall and Keith Jaggers (2000) which consists of three indicators for democracy and autocracy: the degree of competition and political participation; openness of the selection process for political personnel; and the limitation of executive power. The decade value for the regime character was calculated with these data (see Table 2.1.) because the data collection was done according to a unified, all-embracing criterion of three regime types and is available for the complete time period of five decades. In contrast, the other two sets of data are formed either according to a dichotomized criterion (Vanhanen) or the data are not available for all five decades (Freedom House).

All three sets of data on regime types indicate the general trend of an increasing number of states and of an increasing number of democratic states. Until the eighties, the number of autocratic states increases, too. It is only in the nineties that there are more democracies than autocracies. All sets of data show this important finding: that the number of democratic states has a tendency to increase, with the exception of the seventies bringing an end to decolonization.

	50s			60s		70s			80s			90s			End of 90s	
Regimes of countries	Marshall&Jaggers	Freedomhouse	Vanhanen	Marshall&Jaggers	Freedomhouse	Vanhanen	Marshall&Jaggers	Freedomhouse	Vanhanen	Marshall& Jaggers	Freedomhouse	Vanhanen	Marshall&Jaggers	Freedomhouse	Vanhanen	Combined regime-index
Democracies	37	-	32	41	-	37	37	34	33	47	41	56	78	52	98	75
Transitory regimes	14	-	-	24	-	-	18	44	-	17	49	-	34	61	-	29
Autocracies	38	-	45	59	-	73	80	59	78	71	49	81	44	45	62	58
Total of countries	89	-	77	124	-	110	135	137	111	135	139	137	156	158	160	162

*Table 2.1.* Political regimes according to different sets of data (Marshall and Jaggers, Vanhanen, Freedom House), decades 50s to the 90s

For the nineties the three sets of data (Marshall and Jaggers, Vanhanen, Freedom House) were calculated into a combined index according to the most possible concordance (see Table 2.1.). This combined index is included in the calculation of conflict susceptibility and is contained in the list in Appendix 2.

<sup>5.</sup> See Survey of indicators in Appendix 1.

<sup>6.</sup> See Survey of indicators in Appendix 1.

#### 5

## FIFTY YEARS OF CONFLICT BEHAVIOR (1950-2000)

I present the panorama of conflicts by using the database Kosimo<sup>7</sup>. Each state is presented in its empirically observed conflict behavior, whereby two different sets of data are required: first, the absolute number of observable conflicts over five decades, independent of their internal composition and their external environment, of their intensity and their geographic location so that their overall involvement can be determined; and second, a qualified number of incidences of internal and neighboring conflicts so that relationships to the potential measurements could be established. This measurement includes the intensity, i.e. the weights given to the conflicts with the factors 1 for latent conflicts, 2 for crises concerning conflicts that show no or little violence, 3 for serious crises and 4 for wars concerning violent conflicts. The first set thus contains the absolute number of all conflicts, non-weighted, national, neighboring and international, the second set the weighted number of internal conflicts plus conflicts with neighboring states, weighted according to intensity.

#### 5.1 Absolute Numbers

Chart 2.1 shows the increase in the absolute number of conflicts that are recorded over five decades from 1950 to 2000. The differentiation between violent and non-violent conflicts shows that until and into the seventies violent conflicts increased dramatically. Afterwards, the number of non-violent conflicts is prevalent. With autocratic regimes, the dominance of non-violent and violent conflicts changes as an average over decades. After the eighties, non-violent conflicts are prevalent also in these regimes.

## 5.2 Weighted Numbers

The picture changes when we consider the conflict intensities: In course of five decades, democracies and dictatorships both have waged more violent than non-violent conflicts. In contrast to democracies more violent conflicts are attributed to dictatorships. This finding not only holds for absolute figures but also in relation to the existing number of regimes. The intensity of vio-

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<sup>&</sup>lt;sup>7.</sup> Kosimo is a conflict data bank developed by the Institute of Political Science of the University of Heidelberg and contains, in its first version, 661 conflicts that can be reduced to 287 basic conflicts occurring between 1945 and 1995, with 28 descriptive variables. Further information in: F.R. Pfetsch and Ch. Rohloff, 2000. The extended relational data bank Kosimo 2.0 contains 630 conflicts with five categories of intensity and 3300 intensity codings altogether; thus each conflict changed, on the average, five times in intensity. See: www.kosimo.de.



Chart 2.1. Conflicts (non-weighted) violent and non-violent, by decades

lence (number of violent conflicts in relation to existing regimes) is twice or three times higher in dictatorships than in democratic regimes (see Table 2.2., next page, and Chart 2.2., page 31).

Table 2.2. Intensity of violence according to decades and regimes

Decades	50	60	70	80	90
Dictatorships	0,97	1,37	1,01	0,62	1,00
Democracies	0,47	0,29	0,32	0,32	0,36

Sources: Kosimo for conflicts and Polity IV for regimes Number of violent conflicts in relation to existing regimes

## 6 THE POTENTIAL DANGER FOR STATES

In the beginning, I ask the question whether the internal composition and the external environment of a state indicate the danger of violent conflict behavior. From the many factors that trigger or promote conflicts, five indicators have been selected.

**First** of all, there is the internal composition of a state. The pressure by minorities, various groups and communities put on the central government as well as rivalries among various sub-nationalities have led to most of today's conflicts (Pfetsch and Rohloff, 2000: 101). Ethnic conflicts for independence, autonomy, self-determination or secession of minority groups and power rivalries for governmental positions have been most frequent since the seventies. "Ethnic conflicts have become especially widespread" (Donal Horowitz, 1985: xi) and "ethnic groups fight all the time" (Daniel P. Moynihan, 1993: 5). James D. Fearon and David D. Laitin (1996; 2003) however remind us that, among ethnic groups, cooperative relationships can be found more often than violent encounters. This observation has to be taken with reservations since the empirical basis is very small and selective. In the future, the ethnic-religious conflicts will dominate since there will hardly be any more violent conflicts between states. Western states (Spain, Great Britain, etc.) will be affected as well as autocratic (Iran, Iraq, etc.) and transitory regimes (Bosnia, Turkey, Russia etc.).

The collection of data on minority groups in a country is highly problematic. There is no universally accepted definition of a minority. Nevertheless, the U.N. have given a definition of the term mentioning three criteria. It states that a minority has to be a) of a non-ruling group of the population that possess stable ethnic, religious or linguistic traditions; b) it has to be large enough in order to develop such characteristics; and c) it has to be loyal towards the respective state. However, this definition does not capture the fact that, first, there are minority groups that are not necessarily and/or only partially loyal to the state; and second, that with regard to the question of their potential endangerment, nothing is said about their behavior. There exist a large number of minority groups, whether defined ethnically, religiously, culturally, linguistically, etc., which despite all their heterogeneity do not raise claims to change their situation. As to the drawback which exists in the difficulty to distinguish between rebelling from non-rebelling groups, Ted Gurr, with his Risk of Minority Index, considers the behavior of such groups shown in the past (Gurr, 2000). Still there is the shortcoming that population groups are included in the risk index which are without a territorial basis and are to be grouped under Kymlicka's term of multiculturalism (Kymlicka, 1997). One should therefore compare Gurr's data with the data on groups which are living in communities that have a coherent territory within a given country. Only these minorities should be counted, because only such groups can develop a potential of action.

As another approach to measure the heterogeneity of a country indicator, Tatu Vanhanen's ethnic homogeneity indicator was tested. It lists the proportion of the largest groups in a country. I transformed this indicator into a heterogeneity index by calculating the difference to one hundred. The greater the difference, the more groups exist in a country and the more heterogeneous it is.

Second, when citizens flee a country for a neighboring one or one that is considered to be secure for refuge, this expresses the political and economical instability of that country and its government. The number of refugees who flee their country of origin for a destination country offers such evidence. In both countries the political stability is affected by refugees: those fleeing from their country because its insecurity has become so crucial, and those fleeing to the destination country because the native population feels or could feel threatened and this could lead to xenophobic riots. The flight of the Hutus from Rwanda to Zaire, Tanzania and Burundi, caused by civil war, destabilized also the destination countries. This also happened with the Palestinians seeking refuge in Lebanon and Jordan, and the Salvadorian civil war refugees in Honduras as well as the Nicaraguan Indios in Honduras and the Tamils in Sri Lanka. As a measurement for the proportion of political refugees to the entire population, we have chosen to count only political and not economic refugees. The refugees in destination countries are weighted by a factor of 0.33 because it can be assumed that refugees indicate more the instability of the country from which the refugees come than to which they go.

Third, the real or alleged threat with which a government is confronted can indicate a perceived danger. Christopher Layne (1994) found that the perception of threat determines the actions of governments in situations of crises. The threat that a government perceives can be measured by the relative amount of military expenditure, because the countries that arm themselves are mostly those that feel threatened and are in regions of tension, such as Greece and Turkey, Pakistan and India, Israel and neighboring Arab states, etc. Thus, I take the consequences of a threat as an indicator of threat itself. Operationally, this potential of endangerment is represented by the percentage of military expenditure in GDP; for it is empirically proven that governments that feel threatened try to compensate this by the increase of their armaments. By this they trigger the so called security dilemma: neighbouring countries feel threatened as well and increase their armaments, thus escalating the arms race.

**Fourth**, another indicator for instability is the irregular changes of government which show, on the one hand, that there are no constitutional provisions for a peaceful change from one government to another; and, on the other hand, that there are parties, groups or individual politicians who are willing to use forceful means to conquer power positions. A study by the World Bank (2002) has, therefore, taken into account such irregular governmental changes. I have chosen the number of putsches and attempted putsches in a

country as an indicator. Many countries in Africa, South America and the Middle East experience or have experienced such violent changes of power. After 1950 the list of the coups d'états or attempts is headed by Bolivia with 18, followed by Syria with 17, Iraq with 14, Sudan with 12 and Nigeria with 11. In Europe, Greece with six putsches or attempted putsches has had the most (Pfetsch and Rohloff 2000: 140-147).

**Fifth**, endangerment can result from the external and inter-state environment. The geo-political situation of a country and the bordering countries can determine the potential for conflict. Our empirical research shows that external threats to security mostly stem from neighbouring countries (Pfetsch and Billing 1994: 110). Also regional or universal powers can be threatening but only in times of imperialistic politics. Thus, as indicator for external threat I choose the number of neighbouring countries. The more a country has borders the higher can be the potential threat to its security.

These five variables, indicating the endangerment a country is exposed to, are normalized to a scale with hundred points. The index value (shown in Appendix 2) is calculated as a tenth of this average value. It shows the degree of endangerment of a country. In other words, the more discriminated a group/minority in a country is or perceives itself to be, the more a government perceives threat, fear to be replaced by irregular means, the more people are forced to flee, and the more neighbouring countries a country has, the greater is its potential degree of endangerment. Thus the equation reads as follows:

Potential endangerment = F (minorities + instability/crisis + threat + non-constitutional change of government + neighbouring countries).

**Hypothesis 1**: It is expected that endangerment is independent from the regime type and is distributed somewhat equally among countries regardless of the type of political regime. Each regime type could be equally endangered.

**Empirical test**: The list of the most highly endangered states is led by Afghanistan, Angola and Bolivia followed by Uganda, Nigeria, Eritrea, Iraq, Congo (Democratic Republic of the Congo), etc., i.e. states that are not democratic. The countries with the lowest endangerment index are found among democracies (except North Korea and Moldova), e.g. Iceland, Japan, Malta, Taiwan, Ireland, Moldova, North Korea, Norway, Denmark, etc. (see lists in the appendix). The endangerment index shows on both extremes of the scale democratic and autocratic regimes, even so when the list of endangered states is led by non-democratic states and democratic regimes are found among those least endangered.

The list of countries that are ordered according to their endangerment index shows a relatively wide range of endangerment of various regimes across the three groups of countries that can be found in the first, the second and the third part of the list with 54 states in each. The Chi Square test for the entire distribution results in  $\chi^2$  (4, N = 162) = 11.857, p < 0.05. This means that the distribution of the regime types in all three groups with respective endangerment indices differs significantly from an accidental distribution. In other words, in terms of endangerment democracies and autocracies differ significantly from one another. The statistical test does not support hypothesis 1. However, the individual comparisons of pairs show a more differentiated picture: between the dyads democratic and transitory regimes and between autocratic and transitory states there is no statistically significant difference with regard to the index of endangerment.<sup>8</sup> This statistical test delivers, therefore, only limited confirmation of hypothesis 1. Diagram 2.1 shows the high average endangerment of autocratic regimes compared to transitory and democratic ones.<sup>9</sup>



Diagram 2.1. Insecurity by regime types

The countries that show the greatest potential insecurity among the OECD states are Greece, Mexico, Switzerland, Germany, Spain, The Netherlands, as well as Turkey. The countries with the least endangerment are Japan, Ireland,

<sup>8.</sup> The Kolmogorov-Smirnov tests are calculated as individual pair comparisons that correspond to the classic Mann-Whitney U-test (See Basic Statistics Tutorial, www.conceptstew.co.uk), but are also fitting for the bound ranges as they are given.

<sup>&</sup>lt;sup>9.</sup> Average means the sum of the endangerment values of each regime type divided by the number of states of each regime type.