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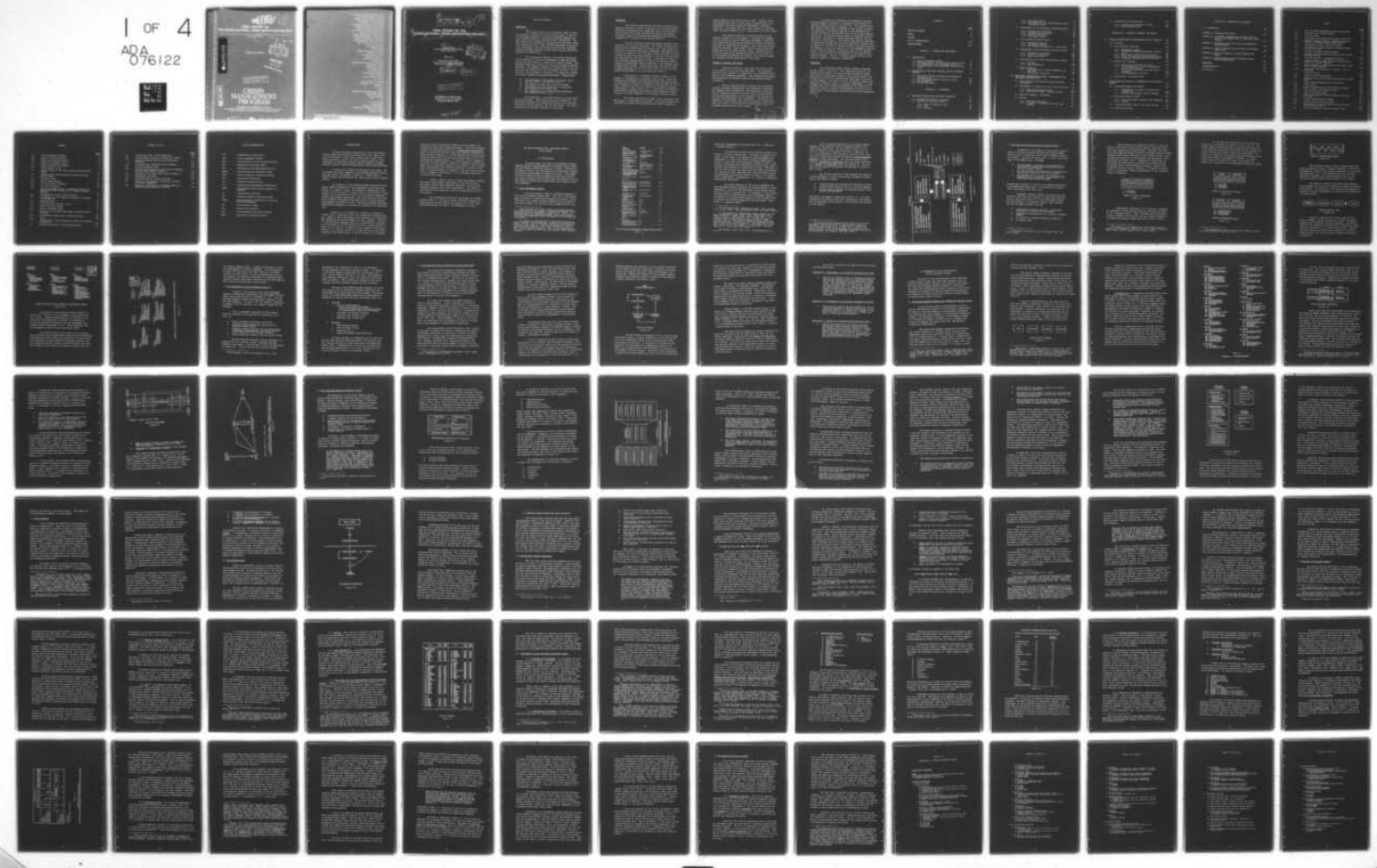

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FINAL REPORT OF THE CROSS-NATIONAL CRISIS INDICATORS PROJECT

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CRISIS MANAGEMENT PROGRAM

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Office of Naval Research • Organizational Effectiveness Research Programs

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decision-making. The technologies and methodologies draw upon research in the social, behavioral, and computer sciences, including quantitative forecasting, decision analysis, and cybernetics. The program is sponsored by the Cybernetics Technology Office of the Defense Advanced Research Projects Agency (ARPA). Technical progress is monitored by the Office of Naval Research — Organizational Effectiveness Research Programs. Current and past participants in the program include:

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FINAL TECHNICAL REPORT,
1 Oct 77 – 30 Sep 78,

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FINAL REPORT OF THE CROSS-NATIONAL CRISIS INDICATORS PROJECT.

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by

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EXECUTIVE SUMMARY

BACKGROUND

The Cross-National Crisis Indicators (CNCI) Project was designed to enhance the crisis warning aspect of the Crisis Management Program of the Defense Advanced Research Projects Agency/Cybernetics Technology Office (DARPA/CTO). The CNCI Project, an outgrowth of the earlier and more basic Interstate Behavior Analysis (IBA) Project, emphasized the exploration, development, and preliminary testing of both indicator systems and models designed to facilitate conflict and crisis tracking and forecasting.

The introductory chapters of this Final Report provide an overview of the Crisis Management Program and contextualize the CNCI Project in terms of the overall Program. The DARPA/CTO/IPPRC Early Warning and Monitoring System is briefly described. The computer hardware and software base of the Program (the CTO Demonstration and Development Facility) is also profiled. The conceptual, theoretical, and empirical subtasks of the CNCI research program ~~are delineated. These~~ include:

- The refinement of the concepts of crisis, international crisis, and domestic crisis;
- The assembly of empirical indicator systems;
- The construction and elaboration of interstate and domestic crisis models; and
- The illumination of linkages between interstate and intrastate crises. → (cont on p iv)

The foundations of the CNCI Project are identified in the second chapter. Among these converging streams are: the events data movement; the comparative foreign policy subfield; the realm of crisis analysis; and the IBA Project. The nexus between the IBA and CNCI Projects is illuminated.

INDICATORS

The indicator specification and data collection processes are charted in detail in Section II of the Final Report. Following an overview of the scope and nature of the international affairs data base, the CNCI data sets are discussed. The country sample is presented and described; data have been assembled for 77 states for the period 1966-1975.

The CNCI intrastate indicator system consists of psychological and societal indicators. The former includes elite attribute and decision-maker value data; the latter consists of measures of economic performance, demography, and domestic conflict and instability. The prototype Internal Situation Profile, a scheme for monitoring and assessing a society's internal problems and potential and actual crises, is discussed in terms of its conceptual underpinnings and some of the pertinent issues relating to measurement theory, methodology, and indicator equivalence across systems. Preliminary results for a pilot study of seven countries for the years 1966, 1970, and 1975 are presented and evaluated in a very preliminary fashion.

The external or interstate indicator domain is also mapped out conceptually and described empirically. Among the phenomena which measure relationships between and among states are indicators of political interactions (derived from the World Event Interaction Survey) and measures of interstate economic relationships. Global factors (e.g., international governmental organization memberships and conflict within bordering states) comprise the other component of the external indicator terrain.

The state classification scheme, which is based on the IBA Project, is described and assessed. The scheme clusters the structural attributes which constitute the static context for

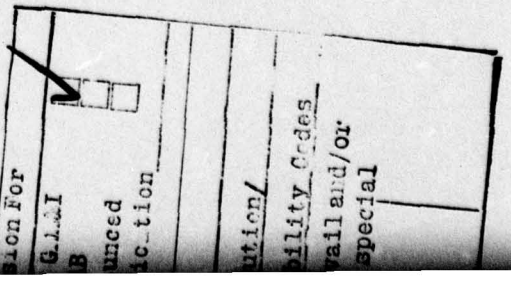
foreign behavior into three distinct areas: economic structure; capability (size, military power, resource base); and governmental structure (political development, structure, stability). The actual data set, which features 23 discrete items, has been amassed for all 77 countries in the CNCI sample.

The special historical crisis data sets are also treated in Section II of the Report. Following the presentation of a brief overview of indicator development within the more general Early Warning and Monitoring System, the special data sets are described and analyzed. Four historical crisis cases are featured: Pearl Harbor; Operation Barbarossa; the Korean War; and the Cuban missile crisis. Among the topics which are explored are descriptive profiles of the data, empirical mapping procedures and patterns, and salient problems and suggested future applications in this area.

THEORIES, CONCEPTS, AND MODELS

Section III entails a shift from the realm of data to the arena of crisis theories and models. The conceptual base for crisis analysis is fleshed out in an extended discussion of "the conceptual labyrinth." The competing situational/decision-making and systemic/interactional perspectives are juxtaposed.

While no genuine theory of crisis can be discerned, a number of models, perspectives, and theoretical frameworks and fragments can be identified. The discussion of the subject is organized around the research nuclei of determinants (crisis anticipation/warning and avoidance), decision-making and resolution/abatement, and consequences. The overall assessment of crisis theory deals with the issues of cumulativeness, the status of non-theoretical research activities, and suggested directions for future inquiry.



In addition to conceptual and theoretical concerns, the development and testing of integrated crisis warning models are central concerns of Section III. The internal-external crisis linkage model is assessed in the context of empirical research on the general question of the determinants of internal stress and the available work on the linkage phenomenon per se. The action-reaction model of interstate conflict and crisis processes is a second prominent theme of the discussion of crisis models. The Partial Least Squares technique, an analytical strategy which has been developed by Herman Wold, is applied to the study of foreign behavior (including conflict); the emphasis in the Final Report is on the fundamental question of the "relative potency" of indicator sets and the specific focus is the character and implications of the popular action-reaction dynamic. Finally, a research agenda involving such potential models as diffusion is specified.

CONCLUSION

The concluding chapter offers a summary assessment of the "state of the field." The conceptual, empirical, and methodological aspects of crisis analysis feature an impressive amount of high quality output; the field continues to be theoretically primitive, although even here there is evidence of some progress. The need to subject frameworks, models, and especially conceptual lenses to constant reassessment is highlighted. The final chapter also emphasizes the importance of "crossing" levels of analysis and attempting to anchor crisis theory within a more general international relations theoretical edifice.

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LIST OF ABBREVIATIONS

CFP	Comparative Foreign Policy
CMP	Crisis Management Program
CNCI	Cross-National Crisis Indicators Project
CTO	Cybernetics Technology Office
DDF	Demonstration and Development Facility
EWAMS	Early Warning and Monitoring System
FBIS	Foreign Broadcast Information Service
I&W	Indications and Warning
ISP	Internal Situation Profile
IGO	International Governmental Organization
IPPRC	International Public Policy Research Corporation
IR	International Relations
IBA	Interstate Behavior Analysis Project
ICPSR	Inter-University Consortium for Political and Social Research
JCS	Joint Chiefs of Staff
PLS	Partial Least Squares
ROZ	Row Percentages and Column Z-Scores
WEIS	World Event Interaction Survey

ACKNOWLEDGMENT

Various individuals contributed to this Final Report. Project coders and research assistants Mark Allen, Merle Feldbaum, Bill Goodwin, Janna Itzler, Michele Lane, Stuart Perry, Helene Rubinstein, and Lee Ann Taylor deserve thanks for their assistance, as does CNCI graduate research assistant Lilymae Fountain. Molly V. Parker provided helpful advice and assistance.

I would like to thank Bob Butterworth, Bob Slater, and Lou Johnson for their comments on the Internal Situation Profile data set, which is discussed in Chapter 3. Thanks also to Michael Brecher and Dave Bobrow for updating me on their research efforts.

Jim Wittmeyer of the Defense Advanced Research Projects Agency (DARPA) Demonstration and Development Facility was very helpful in a number of ways. The comments of Brenda Bell, Mike Daniels, and Tom Davies of the Early Warning and Monitoring System Project at the International Public Policy Research Corporation (IPPRC) were greatly appreciated. Both Steve Andriole and Judith Daly of DARPA's Cybernetics Technology Office provided constant encouragement and helpful advice. Judith Paris edited the entire manuscript and deserves an accolade for completing this herculean task.

Section 3.3.2 of Chapter 3 is based on a section of a paper which I presented at the 1978 International Studies Meeting. Thanks to panel chairperson Larry Falkowski and discussants Sam Kirkpatrick and Donald Lampert for their comments. Chapter 4 is a substantially expanded version of a paper which I delivered with Paul Rossa at the 1978 Western Political Science Meeting; I would like to thank H. W. Cummins for his comments on that paper. Chapter 5 is a revised version of a paper which Paul Rossa and I presented to the crisis panel at the 1978 Meeting of the Midwest

Political Science Association; thanks to Chuck Hermann, who chaired the panel and critiqued the paper. A portion of Chapter 6 draws on a forthcoming article in International Interactions which is coauthored with Paul Rossa and Jonathan Wilkenfeld; an early version of Section 6.2 of that chapter was originally presented to Judith Daly's crisis early warning panel at the 1978 International Studies Meeting. I would also like to express my gratitude to Milton Rokeach, whose value framework provides the basis for the value data reported on in Chapter 3, and to Herman Wold, whose Partial Least Squares technique is adapted to the study of foreign behavior in Chapter 6. Amy Favin wrote Section 3.4.3 of Chapter 3 and Section 3.7.2 of the same chapter was written by Paul Rossa.

Finally, special thanks to three individuals: Jonathan Wilkenfeld (Co-Principal Investigator of the CNCI Project); Paul Rossa (CNCI's Senior Research Associate); and Amy Favin (Research Assistant and Project Coordinator). The latter's contributions were especially vital to the completion of this Final Report.

The individuals cited above contributed to the CNCI research effort in a variety of ways; the author assumes full responsibility for this Report and absolves all of the above from responsibility for any of its weaknesses or errors.

THE CROSS-NATIONAL CRISIS INDICATORS PROJECT: FINAL REPORT

1.0 INTRODUCTION

In recent years, the focus of the Defense Advanced Research Projects Agency/Cybernetics Technology Office (DARPA/CTO) has become increasingly applied in nature. Concurrently, an explicit concern with coordinating and integrating research and analysis has pervaded the DARPA/CTO milieu. These emphases mirror trends in certain segments of political science; both policy-relevance and cumulativeness have emerged as prominent themes in disciplinary communication and research evaluation processes.[1]

1.1 Crisis Management Program

One of the central thrusts of DARPA/CTO research is the Crisis Management Program (CMP). The list of CMP participants in Table 1-1 reflects the amalgam of pure basic, structured basic, and applied research endeavors in the Program.[2] Pure basic inquiry, the initial focus in temporal terms, has

---

[1] The literature on social science and policy-relevance is voluminous; see, for example, Crawford and Biderman (1969). The recent trend is reflected in Snyder et al. (1976). On cumulativeness, see especially Rosenau (1976); the essays in the latter by Rosecrance (1976) and Zinnes (1976) are particularly useful.

[2] In contrast to conventional or exclusively theoretical basic research, "structured basic" research is explicitly designed to "feed into" or interface with applied or directly policy-relevant research. The latter will be the focus of the 1979 and 1980 CMP endeavors. Daly (1978b) summarizes recent results emanating from basic and applied crisis research studies.

Project	Contractor	Dates
EARLY WARNING		
Threat Recognition Process	U of Southern California	73-76
Components of International Behavior (IBA; CACI)	U of Maryland	75-78
Early Warning and Monitoring System	International Public Policy Research Corp. (IPPRC)	76-
Crisis Warning and Management (3 sub-studies)	U of Maryland	75-
Natural Language Processing of Real World Events	Yale	76-
Crisis Forecasting Methods	Carnegie-Mellon	76-
Crisis Dynamics	Analytical Assessments Corp.	77-78
National Interest Indicators for Early Warning	California State/Dominguez Hills	76-77
Event Data Coding	Naval Postgraduate School	76-
Predicting International Crises Using Dynamic Systems Analysis	Indiana	78-
Towards a General Forecasting Model for Crisis Monitoring: Predicting Events in China as a Test Case	Michigan State	78-
Current World Stress Studies	U of Southern California	78-
DECISION MAKING		
Decisions and Events in Crisis	First Ann Arbor Corp.	74-75
Organization, Communication and Decision-Making in Crisis	OSU Research Foundation	74-75
Problems in the Use of Ad Hoc Structures in DoD Crisis Management and Implications for Change	Human Sciences Research	75-76
Organization Effects in Crisis Management	OSU Research Foundation	75-76
Crisis Command, Control, and Communication	Rand Corporation	74-76
Psychological/Sociological Variables in Crisis Management	Human Sciences Research	74-76
Problems in U.S. Crisis Management	CACI	75-76
Political Uses of the U.S. Military in Crises	Brookings	74-76
Crisis Executive Decision Aids	CACI	75-76
Problems in Soviet Crisis Management	CACI	76-
Political Uses of Soviet Military in Crises	Brookings	77-
Research on National Estimates	U of Michigan	78-
Remote Psychophysiological Assessment of Elites During Crises	Northern Illinois	78-
International Terrorism Data System	CACI	78-
GENERAL		
Crisis Inventory	CACI	75-75
Research Gaps in the Management of Terrorist Situations	CACI	77-
Crisis Management Demonstration & Development Facility (DDF)	CCA	77-

LIST OF CRISIS MANAGEMENT PROGRAM PARTICIPANTS

Table 1-1

since been superseded by structured basic and -- especially -- applied analysis.

The overarching objectives of the CMP encompass two distinct -- albeit interrelated -- clusters of research activities. First, there is an emphasis on the development and improvement of crisis monitoring and warning capabilities.[3] Central to this task is the systematic survey of trends, conditions, and events which characterize the pre-crisis, crisis, and post-crisis phases of international affairs. Sub-objectives of this primary task range from the creative delineation of a theoretical base concerning the conditions which nurture and distinguish the evolving phases of crises to the specification, development, and application of a series of integrated quantitative indicators.[4]

The second dimension of the Crisis Management Program highlights salient phenomena in decision-making or crisis management.[5] While the warning aspect of the Program represents an effort to forecast and -- if possible -- avert crises, the user-oriented computer-based crisis management endeavor is designed to "develop option generation and evaluation aids to assist crisis managers after the crisis has begun" (CACI, 1978b: 1-2; emphasis added).

---

[3]See Andriole (1976), Andriole and Young (1977), Belden (1977), Daly (1978a), Daly and Davies (1978), and IPPRC (1978b).

[4]On the subject of international crisis analysis in general, see Hermann (1969b, 1972a, 1975), McClelland (1961), Parker (1977a), O. Young (1968), and R. Young (1977). See also the sources cited above in note 3 as well as IPPRC (1978a); note 7 in the following chapter presents additional pertinent sources. Theories of crisis are discussed in Robinson (1972) and below in Chapter 5. Indicators are the subject of Section 1.2 and Chapter 4 of this Report; see also Rossa et al. (1978, 1979) and Chapter 3.

[5]See Candela (1974), CACI (1977), and Hazlewood et al. (1977).

CACI's prototype executive aid synthesizes several elements of CTO-sponsored crisis management research into three crisis data files. The data bases include a set of 307 U.S. crises over the period 1946-1976, a sample of 101 U.S. crisis operations over the period 1956-1976, and a sample of 41 crises which profiles the central crisis management problems in these operations. The first data base is the source of descriptive information while the second catalogues U.S. actions and objectives during the operations. The data sets and the executive aid system are described in detail in CACI (1978b).[6]

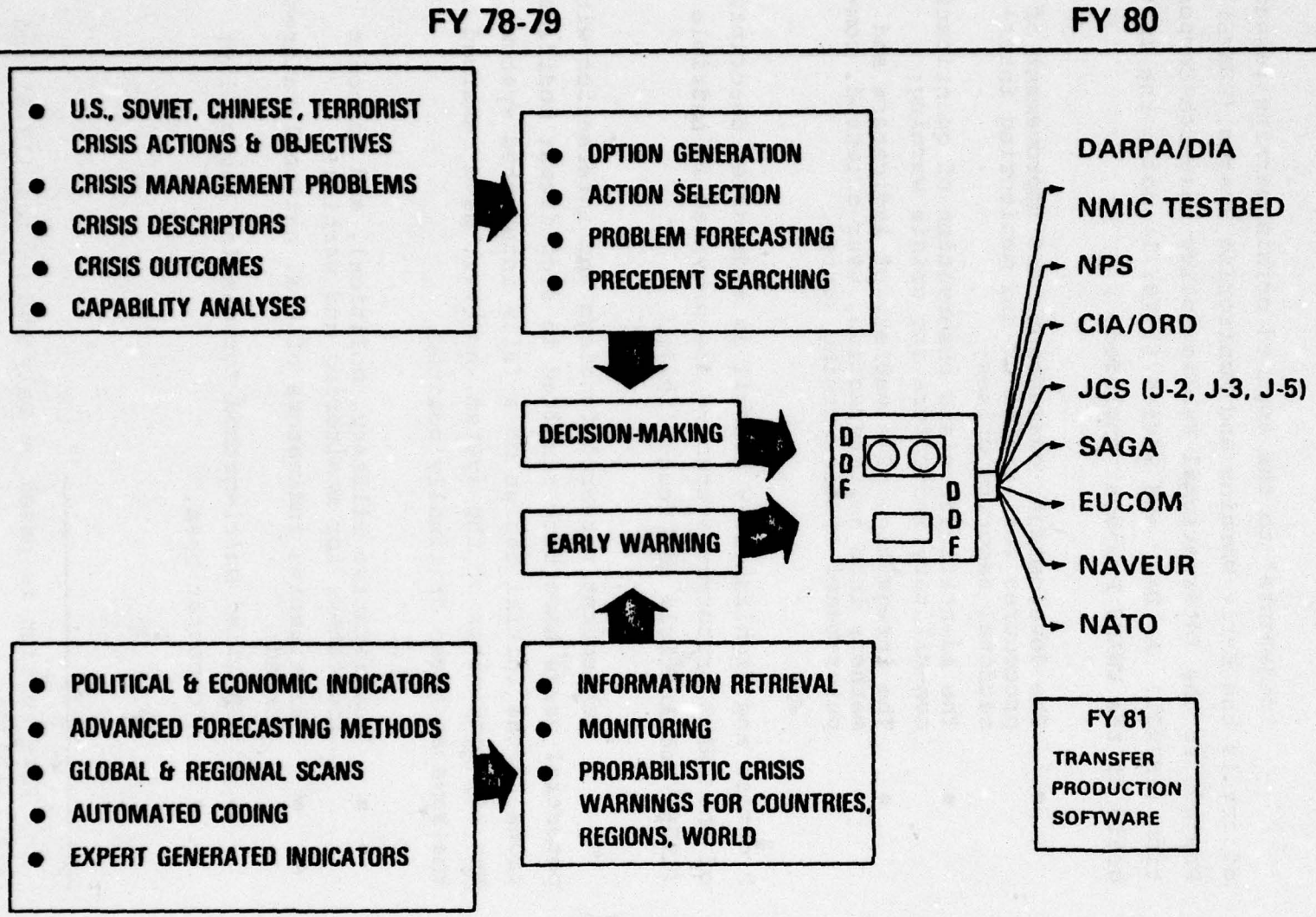
The ultimate objective of CMP research and analysis is the development, testing, and eventual transfer of technology in the following areas:

- Computer-based early warning and monitoring systems;
- Computer-based executive aids for crisis management;
- New quantitative methods for advanced warning, monitoring, and management.

The overall CM program is depicted in Figure 1-1. The early warning and the computer base (DDF) components of the program will be described in more detail in the following two sections of this chapter.

---

[6]A parallel system features Soviet crisis executive aid programs. Included are a set of 386 crises of concern to the Soviet Union (1946-1975), a sample of 101 crises with data on Soviet actions and objectives, and a sample of 101 cases with data on the crisis management problems encountered by the Soviets. For details, see CACI (1978a).



CRISIS MANAGEMENT PROGRAM

Figure 1-1

1.2 The Early Warning and Monitoring System Project[7]

Fundamental to the applied crisis warning research effort is the Early Warning and Monitoring System (EWAMS) Project at the International Public Policy Research Corporation (IPPRC). As Daly and Davies (1978: 1) note, the initial goals of the EWAMS Project included:

- The development, evaluation, and improvement of procedures for warning of and monitoring international security crises;
- The identification and observation of quantitative non-military indicators for crisis warning;
- The integration of a variety of indicators and methods into an interactive, user-oriented, computer-based crisis warning system.

Progress and highlights -- as well as a detailed description of the EWAMS prototype system -- are provided in Andriole (1976) and Andriole and Young (1977).

Subsequent research findings and interaction with potential users have both resulted in significant modifications to the initial design of a fully integrated system. The key components of the system, however, have remained the same as those originally posited:

- Quantitative military, political, and economic indicators for monitoring and warning;
- Quantitative indicators of U.S. national interests abroad;
- A unified multi-method forecasting capability;
- A computer base.

---

[7]This section is based on Daly and Davies (1978) and IPPRC (1978b).

These elements are described in detail in Daly and Davies (1978) and in various IPPRC reports; the description here will consequently be abbreviated. Currently, the indicator base features dynamic political indicators from the DARPA-supported World Event Interaction Survey (WEIS) Project, which includes data from 1966 to the present (see McClelland, 1968; McClelland and Young, 1969).[8] Quantitative indicators for monitoring and warning may be external or internal and can be arrayed along a static-dynamic continuum; substantively, indicators may be military, political, or economic in nature. Figure 1-2 provides a visual representation of the potential range of indicators.

MILITARY				POLITICAL				ECONOMIC			
Static		Dynamic		Static		Dynamic		Static		Dynamic	
I	E	I	E	I	E	I	E	I	E	I	E

I – INTERNAL
E – EXTERNAL

RANGE OF CRISIS INDICATORS

Figure 1-2

Quantitative indicators of U.S. national interests are designed to yield insights into the character and depth of U.S. interests abroad. These interests and classified as current, emerging, and potential and are ranked on country-by-country and regional bases (see Martin, 1977a, 1977b).

---

[8]For details on the application of the WEIS indicator system in the context of EWAMS, see: Daly (1977b); Daly and Bell (1977a, 1977b); Davies (1977, 1978a, 1978b).

The unified multi-method forecasting capability potential is displayed in Figures 1-3, 1-4, and 1-5. The extant EWAMS forecasts external (international) political crises and will eventually incorporate various economic and other internal and external events and conditions.[9] As Figure 1-4 indicates, the current system is designed to generate short-range, retrospective forecasts. In terms of the range of forecasting methods (see Figure 1-5), EWAMS is an associative or extrapolative forecasting system.

EVENTS						CONDITIONS					
Internal			External			Internal			External		
M	P	E	M	P	E	M	P	E	M	P	E

M – MILITARY
P – POLITICAL
E – ECONOMIC

RANGE OF FORECASTING OBJECTS

Figure 1-3

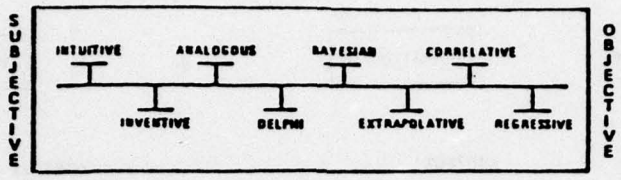
OBJECTIVE						NORMATIVE					
Positive			Negative			Positive			Negative		
R	SR	LR	R	SR	LR	R	SR	LR	R	SR	LR

R – RETROSPECTIVE
SR – SHORT-RANGE
LR – LONG-RANGE

RANGE OF FORECASTING GOALS

Figure 1-4

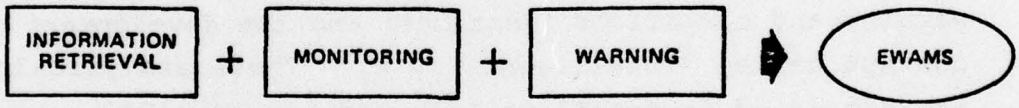
[9]Some preliminary work on the military indicator realm has been undertaken; see Daly (1977a).



RANGE OF FORECASTING METHODS
Figure 1-5

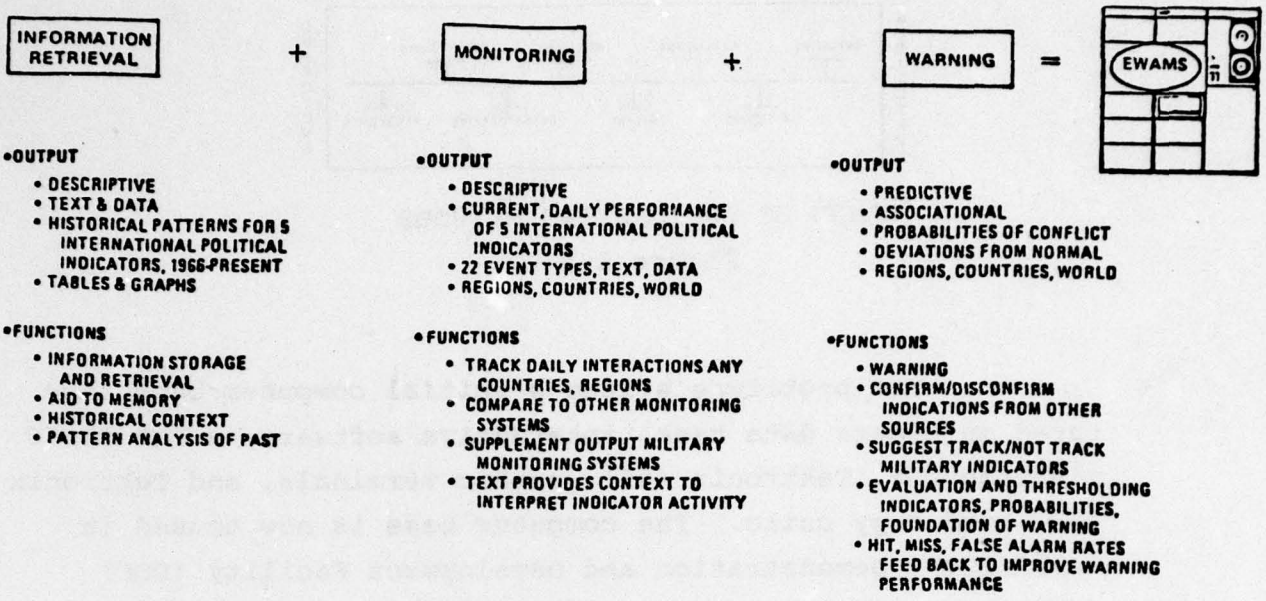
The prototype system's initial computer base featured an events data base, interactive software, a PDP 11/70 minicomputer, Tektronix 4051 graphic terminals, and Tektronix 4631 hard copy units. The computer base is now housed in DARPA/CTO's Demonstration and Development Facility (DDF) (see the following section and Wittmeyer et al. [1978]).

The needs of potential users and a more adequate understanding of the warning problem have resulted in several modifications, as noted above. The initial sole emphasis on forecasting is now supplemented by monitoring and information retrieval systems.



THREE SYSTEMS IN ONE
Figure 1-6

Figure 1-6 depicts the "three systems in one" nature of EWAMS. Textual information, tables, and graphs comprise the information retrieval component. Monitoring refers to the capability for describing relationships among countries and regions on a current, daily basis. Warning currently entails the associative generation of conflict probabilities. The current status of EWAMS is displayed in Figure 1-7.



CURRENT STATUS OF EARLY WARNING & MONITORING SYSTEM

Figure 1-7

The design for the integrated system appears in Figure 1-8. Crucial to the development of this system are four topics: integration/amalgamation of indicators; the transition from monitoring to warning; the blending of warning and operations functions; and the development of a concept called "Intelligent I & W." These analytical foci are discussed in detail in Daly and Davies (1978).

Continued testing of the system, the development and integration of new quantitative economic and intranational indicators for crisis warning and monitoring, the evaluation and integration of other advanced forecasting methods, real-time, off-line parallel testing, and demonstration and transfer of EWAMS are all among the prominent research tasks for

INFORMATION RETRIEVAL + MONITORING + WARNING = EWAMS

- OUTPUT
  - CURRENT +
  - HISTORICAL DATA AND PATTERNS FOR MILITARY, ECONOMIC, DOMESTIC, AND U.S. MILITARY COMMITMENT INDICATORS
  - TABLES AND GRAPHS
- FUNCTIONS
  - CURRENT +
  - ANALYSIS PATTERNS IN PAST MILITARY, ECONOMIC, DOMESTIC & U.S. MILITARY COMMITMENT FOUNDATION OF MONITORING

- OUTPUT
  - CURRENT +
  - SCANS (regions, systemic, output, and attribute type)
  - CURRENT PERFORMANCE MILITARY ECONOMIC, DOMESTIC, NATIONAL INTEREST INDICATOR
  - SINGLE COUNTRY POLITICAL, MILITARY, ECONOMIC INDICATORS
- FUNCTIONS
  - CURRENT +
  - SCANS – INCREASE ANALYST EFFICIENCY
  - TOP DOWN (systemic scan; country pair single country) – INCREASE ANALYST EFFICIENCY
  - COMPARE TRACKING, SIGNALS DIFFERENT TYPES OF INDICATORS
  - FOUNDATION OF OPS/INTELLIGENCE LINK?

- OUTPUT
  - CURRENT +
  - CONFLICT WARNING BASED ON
    - scans
    - domestic, military, economic single country indicators
  - ANALYST DETERMINED THRESHOLDS AND TAILS
  - REGRESSION, MARKOV-BASED, AND DECISION ANALYTIC FORECASTING METHODS
- FUNCTIONS
  - CURRENT +
  - TOP DOWN WARNING
  - COMPARE, CROSS-CHECK WARNINGS DIFFERENT TYPES OF INDICATORS
  - HIT, MISS, FALSE ALARM RATES FEED BACK TO IMPROVE INDICATOR PERFORMANCE
  - MULTI-TRACK, MULTI-METHOD WARNING CAPABILITY
  - INTELLIGENT I&W

DESIGN FOR INTEGRATED EARLY WARNING & MONITORING SYSTEM

Figure 1-8

the current research cycle. A number of indicator and software enhancements can also be expected. The contributions of other CMP contractors will also "feed into" the EWAMS Project; the CNCI Project, as will be demonstrated later in this chapter, was explicitly designed as a structured basic research endeavor which would interface with the more applied Early Warning and Monitoring System Project.

1.3 The Demonstration and Development Facility[10]

Central to the success of the Crisis Management Program is DARPA/CTO's Demonstration and Development Facility (DDF), which began operation on November 23, 1977. The DDF provides computer research and development resources to the CMP user community. In fiscal 1979, the Computer Corporation of America (CCA) DDF operation will expand to serve all CTO programs.

DDF is a permanent repository of CMP products. Among the purposes of the facility are (Wittmeyer et al., 1978: 2):

- Sharing hardware and software resources;
- Providing expert support and consultation on computer-related matters;
- Creating a central facility for the installation, integration, demonstration, and storage of completed computer-related research products;
- Making technology transfer from one central source.

The DDF currently features a Digital Equipment Corporation PDP 11/70 computer system, associated software, terminals, and modems. A second PDP 11/70 will be added early in fiscal 1979. The DDF uses the UNIX operating system

[10] See Wittmeyer (1978) and Wittmeyer et al. (1978).

developed at Bell Laboratories; UNIX is a multipurpose, multiprogramming time-sharing operating system. In addition to the large number of subsystems that are available with UNIX, the DDF supports Fortran IV Plus (F4P) from Commercial Union Learning Corporation (CULC) and Tektronix PLOT 10 and PLOT 50 software. SPSS (Statistical Package for the Social Sciences) and other software systems are also available.

The goal of both EWAMS and DDF personnel is to test and transfer a fully integrated, flexible interactive computer-based early warning and monitoring system. The current status of the DDF-based EWAMS hardware and software may be summarized as follows (see also Daly and Davies, 1978: 30):

- Hardware
  - * PDP 11/70 minicomputer
    --128 K words with cache memory
    --88 million characters of off-line storage
    --9 track magnetic tape off-line storage
  - * Tektronix 4051 graphic terminals
  - * Tektronix 4631 hardcopy units
  - * Tektronix 4097 floppy disc

- Software
  - * UNIX operating system
  - * CULC's Fortran IV Plus
  - * Tektronix Plot 10
  - * Binary and Random Access Data Files

As noted, the DDF is a repository for all CMP work. All CNCI data sets have been deposited at the Facility and will thus be available to other contractors (see Hopple and Rossa, 1978a). Documentation for the Fortran program which was developed specifically for our model testing work will also be available at the site (see Rossa, 1978d).

1.4 Cross-National Crisis Indicators Project Objectives[11]

The normative and empirical importance attached to the outbreak of military confrontations between and among states has prompted three related research traditions in the field of international politics. The first is the study of war, wherein scholars seek to identify the factors which lead to or result in violent military exchanges among countries. A second approach entails the analysis of conflict, which broadens the focus to include all forms of hostile interaction and treats military engagement as an extreme manifestation of such behavior; the causes of war are found within the explanation of conflict more generally.

The third, more recently developed tradition is that of crisis research. Crises, like wars, are discrete events or situations signifying intense strains on interstate relations. However, crises, like conflict in general, may be precursors of war. Military confrontation is a possible consequence of crisis management and crises are closely related to the immediate or precipitating causes of war (Choucri and North, 1975: 164). The development of crises, on the other hand, is intertwined with the patterns of conflict more generally and represents a culmination of hostilities.

The Cross-National Crisis Indicators (CNCI) Project is designed to enhance our ability to understand and specify the dynamics which lead to crises and to provide the policy commmunity with useful tools for monitoring and forecasting such dangers. Propositional inventories notwithstanding (e.g., Hermann and Brady, 1972; Shapiro and Gilbert, 1975), much additional work is clearly needed in terms of the construction of theoretical models which are capable of treating

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[11] For details, see Wilkenfeld and Hopple (1977), Rossa (1978c), and Rossa et al. (1979).

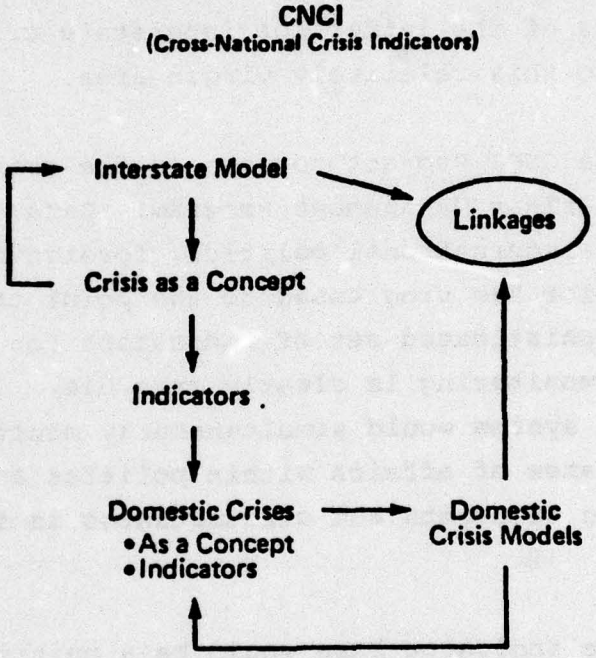
pre-crisis behaviors and generating accurate indicators of impending developments. Thus, the CNCI Project will focus upon relatively basic research concerning the dynamics of conflict for the purpose of forecasting crises, which are often preludes to war. Models of international political behavior and the resultant indicators of crises will be the central concern. Additionally, the importance of intrastate dynamics -- leading to domestic crises -- and the possible ramifications of the latter for interstate crises will spur research into this relatively virgin area.

The CNCI Project focuses on the crisis warning aspect of the Crisis Management Program. Data collection in the study of international politics, foreign policy, and crisis behavior has progressed to the point that the development of a sophisticated set of indicators for crisis early warning and monitoring is clearly feasible. Ideally, such an indicator system would simultaneously monitor developments and states of affairs within polities and chronicle the unfolding of events and circumstances in the external arena.

The indicator base would be a multitiered tracking system; in addition to the external, dynamic political indicators which currently comprise the DARPA/CTO EWAMS, a panoply of internal and external indicators will be integrated. Such indicators will span the continuum from static attributes to dynamic, fluctuating variables.

Figure 1-9 depicts the CNCI Project in more detail. As we noted in our proposal (see Wilkenfeld and Hopple, 1977), virtually all of the prior work on the forecasting of conflict and crisis has centered on indicators at the international level. The research in the academic community has concentrated primarily on political indicators such as tension, event/interactions, and perceptions of threat and hostility. The

defense community has confined its focus almost exclusively to the domain of military indicators, including troop movements, arms supplies and sales, weapons development, and operations. Neither the defense nor the academic research community has conducted extensive research in the realm of economic indicators (see Parker, 1977b).



THE CNCI PROJECT
Figure 1-9

The CNCI Project is designed to fill in the lacunae and enable analysts to employ indicators of conflict and crisis in all substantive realms at the intrastate and interstate levels of analysis. In attempting to accomplish this objective, we have devoted a considerable portion of our effort to the specification and development of indicators at the domestic level of analysis. While the crisis forecasting literature has focused almost exclusively on the international

system and its characteristics, we contend that certain types of international crises may originate in the domestic sphere. Consequently, the development of a comprehensive, sophisticated monitoring system which is designed to alert the analyst to potentially dangerous intrastate crises will be of considerable value.

The scope of the CNCI research program includes conceptual, theoretical, and empirical subtasks. Conceptually, the concepts of crisis, international crisis, and domestic crisis must be delineated and refined. Empirically, data must be amassed in the various realms. Along with conceptual specification and operationalization, interstate and domestic crisis models should be constructed and elaborated. A constant feedback involving conceptual, theoretical, and empirical developments should be encouraged.

Equally central to the CNCI research design is the search for linkages between interstate and intrastate crises. A discernible research tradition has postulated and empirically assessed linkages between internal and external behavioral phenomena (e.g., East, 1973; Farrell, 1966; Wilkenfeld, 1973). Linkages between interstate and intrastate dynamics -- to be discussed in detail later in this report -- comprise a central focus of CNCI work.

The CNCI Project envisions two primary research products for utilization by the EWAMS staff at IPPRC and the policy community. These products are <u>models</u> and <u>indicators</u> of foreign behavior which are relevant to crisis forecasting and tracking. The focus upon model specification and development grounds research in the mainstream of empirical international relations analysis, while the emphasis on indicator development based on modelling efforts links the research to policy concerns.

The initial objectives and tasks of the CNCI Project are delineated below.

Objective 1 - Development of Intrastate Indicators of Crises

- Here we will develop a set of indicators which will monitor the internal arena in a systematic fashion and provide information on potential crisis situations. The fundamental premise of this objective is that internal crises of a political, economic, and social nature will, at least in the context of certain circumstances, have consequences beyond the borders of the affected states. In addition, such crises can contribute to the initiation, perpetuation, and intensification of interstate crisis situations.

Objective 2 - Development of Interstate Indicators of Crises

- This objective entails the development of a set of indicators designed to monitor fluctuations in the interstate behavior of states and to assess the impact of trends in the interstate or systemic context in which these states operate.

Objective 3 - Testing of Integrated Crisis Warning Models

- After the interstate and intrastate indicator systems have been developed, operationalized, and tested, we will construct models to identify the interrelationships among indicators. These models will then be incorporated into a final set of indicators, which will be integrated into the Crisis Management Program's computer-based Early Warning and Monitoring System.

2.0 FOUNDATIONS OF THE CROSS-NATIONAL CRISIS INDICATORS PROJECT

The roots of the Cross-National Crisis Indicators or CNCI Project include the events data movement, the comparative foreign policy subfield, the realm of crisis analysis, and the Interstate Behavior Analysis or IBA Project. The latter was a DARPA-sponsored basic research project which attempted to integrate the disparate empirical and theoretical research on foreign policy and construct testable models of foreign policy output activity.

2.1 The Events Research Movement and Comparative Foreign Policy

One of the most obvious manifestations of the impact of the behavioral revolution on the study of international affairs is the proliferation of quantitative indicators. The foreign events data movement is a particularly noteworthy example. The burgeoning literature on the subject attempts to illuminate the nature of events data as a concept, describes and compares the various data sets, and provides illustrative applications.[1]

The events data movement transforms the multifaceted, elusive construct of "foreign policy" into the more manageable, empirically measurable concept of "foreign behavior" or "foreign outputs." A foreign event is equated with a discrete, observable action; foreign policy analysts, "faced with the complexity of continuous reality" (Riker, 1957: 59), literally break reality up into pieces -- or events. Events

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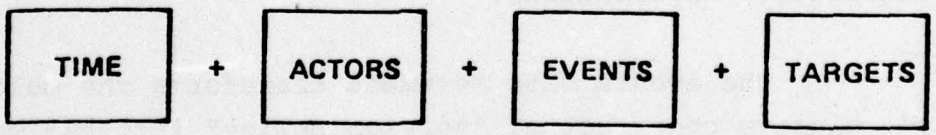
[1]See, e.g., Azar and Ben-Dak (1975), Brody and McClelland (1972), Burgess and Lawton (1972), Gamson and Modigliani (1971), Hermann (1976, 1978), Hermann et al. (1973), Kegley (1973), Kegley et al. (1975), McClelland (1976), and Sigler et al. (1972).

function as empirical referents for describing and comparing foreign policies (Hermann, 1971).

The lack of common analytical assumptions accounts for the proliferation of dimensions for defining and classifying foreign behaviors. Salient classificatory dimensions include relational identifications, goals, orientations, and inferred motivations (Hermann, 1972b; Kegley, 1973; Salmore and Munton, 1974). Typologies of foreign policy may be definitional, ad hoc, or empirically-based in nature (Kegley, 1973). Hermann (1978: 37) distinguishes between the a priori specification and the data reduction approaches to classifying foreign behavior.[2]

Issues of conceptualization and classification, which are endemic to intramural disputes in the events data movement, are reflected in the various data sets which have been amassed. The basic definition of events data as the consequence of observing "a communication process that records 'who says what to whom'" (Burgess and Lawton, 1972: 6) elicits universal agreement. Figure 2-1 portrays the coding elements which are common to all event data sets.



EVENT CODING ELEMENTS
Figure 2-1

[2]The former is described in detail in East et al. (1978) and Hermann et al. (1973); examples of the latter include Kegley (1973), Salmore and Munton (1974), and McClelland and Hoggard (1969). The results described below in Section 3.5.2 (p. 103) also exemplify the data reduction approach.

Beyond the consensus on this fundamental definition, however, significant differences arise. Burgess and Lawton (1972) catalogue the major variations in their comparison of 11 events data projects. Among these differences are: number of actors (global vs. a subset); types of actors (exclusion or inclusion of non-national actors); types of targets (direct and/or indirect); time frame; unit of aggregation (day, week, etc.); number of sources; and reliability measures. Perhaps the most basic distinction revolves around the competing alternatives of categorization and scaling.

Categorization -- typified by the World Event Interaction Survey (WEIS) coding scheme -- simply involves the assignment of events to categories such as threat, request, or accuse. The 22 general and 63 specific nominal WEIS categories are listed in Table 2-1. In contrast, scaling entails the identification of the content of an event and then its measurement on the basis of assigning a number to indicate its position on a given continuum. Intensity, for example, can be scaled along a conflict-cooperation continuum. Generally, judges are used to rank a large number of events. The 13-point interval scale developed by Azar et al. (1972) for measuring internation violence is a prominent example.

The basic events data set for the EWAMS and CNCI Projects is McClelland's DARPA-sponsored WEIS data base. The WEIS data set currently consists of over 100,000 public, nonroutine, official event-interactions (including a variety of verbal and physical acts arrayed along a cooperation-conflict continuum). The data span the period from 1966 to the present and can therefore be employed for retrospective as well as real-time forecasting and monitoring purposes.

1. YIELD

- 011 Surrender, yield to order, submit to arrest, etc.
- 012 Yield position; retreat; evacuate
- 013 Admit wrongdoing; retract statement

2. COMMENT

- 021 Explicit decline to comment
- 022 Comment on situation-pessimistic
- 023 Comment on situation-neutral
- 024 Comment on situation-optimistic
- 025 Explain policy or future position

3. CONSULT

- 031 Meet with; at a neutral site; or send note
- 032 Visit; go to
- 033 Receive visit; host

4. APPROVE

- 041 Praise, hail, applaud, condolences
- 042 Endorse other policy or position; give verbal support

5. PROMISE

- 051 Promise own policy support
- 052 Promise material support
- 053 Promise other future support
- 054 Assure; reassure

6. GRANT

- 061 Express regret; apologize
- 062 Give state invitation
- 063 Grant asylum
- 064 Grant privilege, diplomatic recognition de facto relations, etc.
- 065 Suspend negative sanctions; truce
- 066 Release and/or return persons or property

7. REWARD

- 071 Extend economic aid
- 072 Extend military assistance
- 973 Give other assistance

8. AGREE

- 081 Make substantive agreement
- 082 Agree to future action or procedure; agree to meet, to negotiate

9. REQUEST

- 091 Ask for information
- 092 Ask for policy assistance
- 093 Ask for material assistance
- 094 Request action; call for
- 095 Entreat; plead; appeal to

10. PROPOSE

- 101 Offer proposal
- 102 Urge or suggest action or policy

11. REJECT

- 111 Turn down proposal; reject protest demand, threat, etc.
- 112 Refuse; oppose, refuse to allow

12. ACCUSE

- 121 Charge; criticize; blame; disapprove
- 122 Denounce; denigrate; abuse

13. PROTEST

- 131 Make complaint (not formal)
- 132 Formal complaint or protest

14. DENY

- 141 Deny an accusation
- 142 Deny an attributed policy, action, role or position

15. DEMAND

- 150 Issue order or command, insist; demand compliance, etc.

16. WARN

- 160 Give warning

17. THREATEN

- 171 Threat without specific negative sanctions
- 172 Threat with specific negative sanctions
- 173 Threat with force specified
- 174 Ultimatum; threat with time limit and negative sanctions specified

18. DEMONSTRATE

- 181 Nonmilitary demonstration; walk-out on
- 182 Armed force mobilization, exercise and/or display

19. REDUCE RELATIONSHIP

- 191 Cancel or postpone event
- 192 Reduce routine international activity; recall officials, etc.
- 194 Halt negotiations
- 195 Break diplomatic relations

20. EXPEL

- 201 Order personnel out of country
- 202 Expel organization or group

21. SEIZE

- 211 Seize position or possessions
- 212 Detain or arrest person(s)

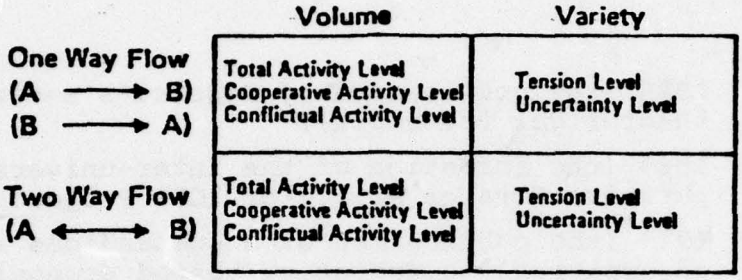
22. FORCE

- 221 Non-injury destructive act
- 222 Nonmilitary injury/descruction
- 223 Military engagement

Table 2-1

THE WEIS EVENTS CODING SCHEME

Various crisis indicators have been developed from the WEIS data. The original EWAMS indicators refer to the concepts of volume and variety and one- and two-way flows.[3] Entered into the cells of Figure 2-2 are activity, tension, and uncertainty indicators. EWAMS also calculates Z-scores -- deviations from normal or baseline behavior -- for each of the indicators.



POLITICAL EVENT INDICATORS

Figure 2-2

More recent work has concentrated on the testing of the following EWAMS indicators: ROZ; cooperative and conflictual activity; and the tension measure. In addition, the political indicators have been compared with extant military indicators. ROZ (row percentages and column Z-scores) is "an indicator for single country performance that takes into account the country's weekly portion of the total (world) action and the extent to which that portion is exceptional in comparison to the ten-year average [McClelland, 1976]." McClelland has demonstrated that ROZ is effective as a warning sign of impending danger, a monitor of on-going trouble, and a measure of post-crisis shock. The indicator thus enhances all three EWAMS functions: information retrieval; monitoring; and warning. Recent EWAMS analyses of ROZ are reported in Daly and Davies (1978) and Daly and Wittmeyer (1977).

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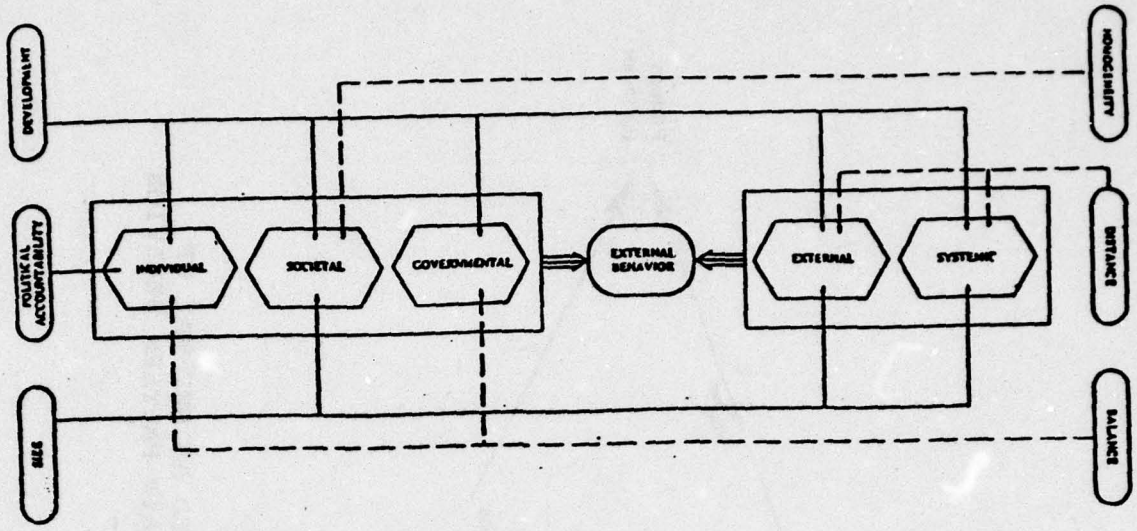
[3] Although adjustments have been made to these indicators, they are based on the work of McClelland et al. (1971); see also Young et al. (1972) and Spector et al. (1975).

In addition to the extensive basic and applied research on events data, the emergence of a genuinely scientific approach to foreign policy analysis also provided an indispensable foundation for the CNCI Project. In fact, the events data and comparative foreign policy (CFP) movements have developed in a symbiotic fashion (see, e.g. Kegley et al., 1975). A chronology of CFP would highlight the following dates:

- 1966 (the publication of Rosenau's seminal pre-theoretical framework);
- 1969 (the formation of the Inter-university Comparative Foreign Policy or ICFP Project);
- 1973 (the publication of a compendious inventory of empirical, comparative tested propositions [McGowan and Shapiro, 1973] as well as the ICFP Meeting on the Future of Comparative Foreign Policy Analysis at Ojai, California).

Two approaches have dominated empirical CFP inquiry. One involves the construction (but rarely the testing) of overarching frameworks. Examples include Andriole et al. (1975), Brecher et al. (1969; see also Brecher, 1977c), Coplin (1974), Lentner (1974), Rosenau (1966), and Snyder et al. (1962). The Rosenau pre-theory is depicted in Figure 2-3. The other strategy entails the formulation and testing of ad hoc hypotheses concerning one or more potential determinants of foreign policy (see McGowan, 1976; McGowan and Shapiro, 1973).

In the "typical" CFP research design, foreign behavior (i.e., discrete, observable events) is posited to be the dependent variable. An array of source or independent variables -- often clustered into a variety of internal and external variable realms -- is viewed as the determinants of external actions. The analyst then attempts to achieve one of the following two objectives:



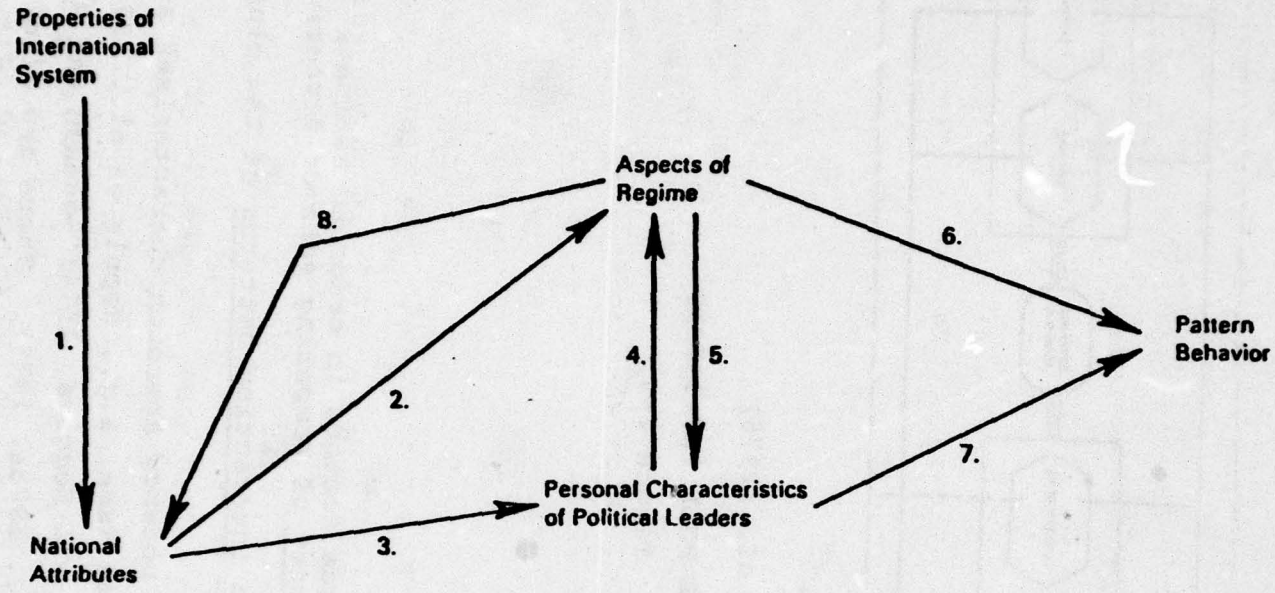
Source: Powell et al. (1976)

THE FULL PRE-THEORY

Figure 2-3

- Rank the source factors in order to estimate the relative potency of competing sets of forces;
- Ascertain the interaction patterns of the clusters.

The relative potency approach characterizes a number of empirical studies (see, e.g., Hopple et al., 1977b; Rosenau, 1966; Rosenau and Hoggard, 1974; Rosenau and Ramsey, 1975; Wilkenfeld et al., 1978a, 1979). There are also examples of the variable configuration or interaction strategy (see, e.g., East et al., 1978; Powell et al., 1974, 1976). Figure 2-4 illustrates a multicausal model of foreign behavior.



Source: East et al., 1978: 198

MULTICAUSAL MODEL (MODEL 1) PROPOSED AS ONE WAY OF INTEGRATING CREON PERSPECTIVES TO EXPLAIN PATTERN BEHAVIOR

Figure 2-4

2.2 The Interstate Behavior Analysis Project[4]

The confluence of events data research and CFP clearly characterizes the Interstate Behavior Analysis (IBA) Project. The IBA Project, which was designed to construct and operationalize a framework for the comparative analysis of interstate behavior, was explicitly cross-national in focus and quantitative in nature. The stages of IBA inquiry included:

- Conceptualization and boundary-delineation;
- Framework-construction and refinement;
- Operationalization of variables and the assembly and collection of data in various internal and external realms;
- Development of analytical strategies;
- Construction and testing of causal models of foreign behavior.

Initially, it was necessary to delineate the scope of inquiry of foreign policy analysis. If a field of inquiry lacks clearly defined research boundaries, then the analyst faces the prospect of producing disparate, noncumulative knowledge. As Rosenau has asserted:

> In the absence of a subject matter with an internal coherence of its own,...researchers can never be sure whether in fact they are engaging in a common enterprise. Under such circumstances, they may actually be working on highly diverse problems that share only the labels that are attached to them. What is regarded as "the field" may be no more than a composite of several different enterprises that overlap in some respects but that have distinctive subject matters, viewpoints, and propositions of their own [1968: 310].

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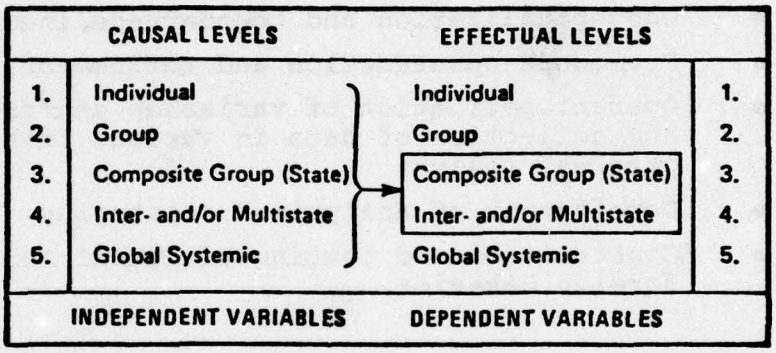
[4]This section provides a summary of Wilkenfeld et al. (1978a).

Levels of analysis, which refer to the general analytical areas on and from which certain behaviors normally occur, constitute the basis for delineating a coherent scope of inquiry. Five two-dimensional (causal and effectual) levels can be identified; in ascending order, they are the individual, group, state, inter- and/or multi-state, and global levels of analysis. Figure 2-5 pinpoints the effectual levels from which foreign behavior ordinarily emanates and depicts the universe of comprehensive foreign policy inquiry.



COMPREHENSIVE FOREIGN POLICY ANALYSIS
Figure 2-5

With the recognition that foreign behavior occurs at the state and interstate levels, we can differentiate between two distinct approaches to foreign policy analysis:

- Source analysis;
- Process analysis.

The first refers to that which results from the impact of certain internal and/or external stimuli. After a state decides to respond to a set of stimuli, its decision-making machinery is set into motion. This suggests the need to investigate what may be conceptualized as initiative and responsive decision-making processes.

A systematic evaluation of earlier work provided the initial impetus for the IBA research. We specified four evaluative criteria to be used in this assessment:

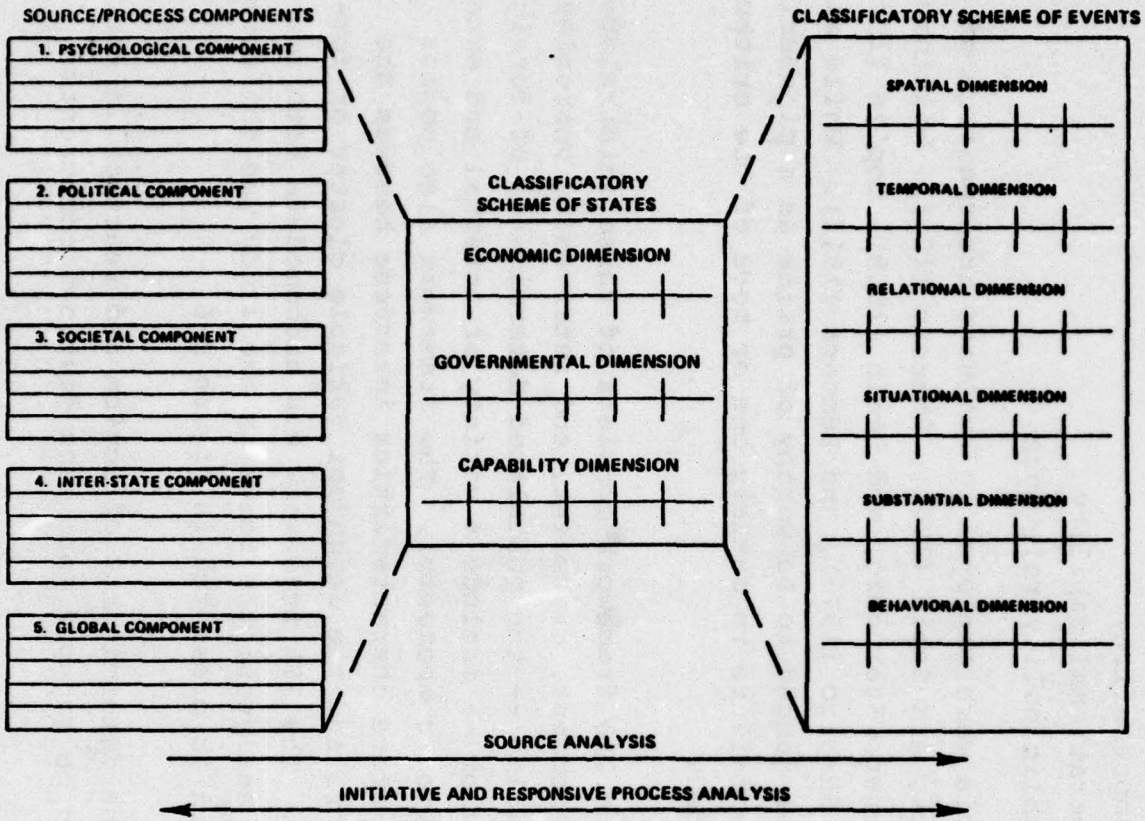
- Comprehensiveness
- Comparability
- Operationalizability
- Public policy relevance

These criteria were employed to evaluate the research of Snyder, Bruck, and Sapin (1962), Rosenau (1966), Wilkinson, (1969), Brecher, Steinberg, and Stein (1969), Coplin (1974), McGowan and Shapiro (1973), and Lentner (1974). While each framework was judged to be worthy of praise as a pioneering venture, the failure to satisfy one or more of the criteria was also noted.

The IBA framework consists of three interrelated sets of independent, dependent, and intervening variables. Source variables -- the postulated determinants of foreign policy behavior -- include a variety of internal and external factors (or components). The framework also posits that static state characteristics intervene between the source factors and the dependent variable cluster of foreign policy. The IBA framework can accommodate both source and process analyses; the focus in the study was the former. The framework is presented in Figure 2-6.

The determinants of action and reaction in source analysis can be grouped into five distinct components:

- Psychological
- Political
- Societal
- Interstate
- Global



A FRAMEWORK FOR THE
COMPARATIVE ANALYSIS OF FOREIGN POLICY BEHAVIOR

Figure 2-6

Each of the five variable realms has attracted attention from past researchers. East et al. (1978), McGowan and Shapiro (1973) and Wilkenfeld et al. (1978a) provide dozens of specific examples.

A considerable amount of conceptual and empirical work has been produced in the area of classification schemes of foreign policy actors.[5] Initially, we found it necessary to resolve three critical methodological issues:

- The first concerned the difference between attributes which are relatively stable over time vis-a-vis those which are more dynamic in nature. The more stable attributes -- or structural characteristics -- provide the static context within which foreign policy decisions are made.
- The second dealt with the frequent tendency to use only one variable for each major dimension of classification. A multiple indicator strategy is empirically more realistic and theoretically more productive.
- The third issue related to the level of measurement which is appropriate for the index. We utilized continuous indicators based on a multiple indicator approach.

The classificatory scheme is subdivided into three general areas: economic structure; capability (size, military power, resource base); and governmental structure (political development, structure, stability). We operationalized this domain with 23 specific variables. Factor analytic results generated a four factor solution, including economic, governmental, capability, and instability dimensions.

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[5]For details on the state classification scheme, see Wilkenfeld et al. (1978b); see also Section 3.6 below (pp. 110-115).

In addition to the R-factor analysis (which permits the ranking of states on structural dimensions based on factor scores), we also purused a Q-factor analytic strategy in order to group the 56 states into a set of parsimonious, meaningful types. Five clusters emerged: Western; Closed; Large Developing; Unstable; and Poor.

Many analysts have simply failed to conceptualize or measure adequately the central unit of analysis -- foreign policy. We centered upon a definition of foreign policy which is based on action properties. A foreign policy event consists of a number of attributes, including spatial, temporal, relational, situational, substantial, and behavioral dimensions. Our measures of behavior were derived from the 22 categories of interstate behavior developed by the World Event Interaction Survey (WEIS) Project.

We separately factor analyzed the behavior sent and behavior received domains and constructed factor score indicators for each state in both arenas. The behavior sent data clustered into constructive diplomatic, non-military conflict, and force types. Somewhat different patterns characterized the behavior received domain. A single dominant factor emerged (diplomatic behavior), along with force and reward factors. The behavior sent factors are the dependent variables in our source analyses, while the behavior received factors comprise part of the interstate component.

In developing analytical strategies, we concentrated on two issues:

- The model and statistical techniques which relate the data within the components to the dimensions of foreign policy behavior.
- The model and statistical techniques which can be employed for the purpose of imposing controls to take into account the mediating role of state classificatory scheme dimensions.

The framework clearly suggests that both components (general conceptual arenas) and discrete variables (indicators within components) are relevant to analyses of foreign policy behavior. As noted, the issue of relative potency is a central one in foreign policy analyses. We adopted the "Coleman analysis" strategy, which assumes that the combination of indicators within a block of variables should be based upon the ideal of maximizing the explanatory power of that block. The dependent variable was regressed upon the indicators of one component and the (standardized) predictions serve to represent the combination of indicators; the beta weights index the effects of discrete variables. Relative potency between two or more components was ascertained by regressing the dependent variable upon the set of predictions, thus providing comparative betas for component combinations.

The single difficulty in applying Coleman analysis to the IBA research task pertained to the treatment of the dependent variable realm. A single dependent variable is provided for; within our framework, however, the dependent variable (foreign policy behavior) was operationalized with three indicators. Fortunately, recent advances in econometrics provided explicitly for modifying Coleman's model for the purpose of incorporating a latent dependent variable. Nonlinear Iterative Partial Least Squares (NIPALS) is an approach to modelling latent variable relationships.

The NIPALS model provides the following information:

- The relative potency of independent latent variables in accounting for the dependent latent variable (the relative potency of interstate, societal, and other components in explaining foreign policy behavior generally);

- The ability of the model to account for foreign policy behavior generally;
- The ability of the model to account for each manifest dependent variable (force, non-military conflict, and constructive diplomacy);
- The direction and size of the effect upon foreign policy behavior of an individual manifest independent variable which is housed within a component.

Variables which mediate between independent and dependent variables as conditioning factors, such as the state typological domain, are "moderators" of relationships. Moderators can be imposed upon models in two ways: through subgrouping or through moderated regression. Subgrouping is the process of dividing the sample of cases into homogeneous classes. The subgrouping technique involves model estimation for each group and comparisons of results across groups. The effects of the moderator(s) are gleaned from this comparison. Moderated regression entails an attempt to build assumptions of moderator effects into the model itself. While subgrouping imposes no restrictions upon the nature of the moderator effects, moderated regression involves assumptions regarding the relationship between the moderator(s), on the one hand, and the regression weight (or beta) relating independent and dependent variables, on the other.

We employed a relatively straightforward analytic strategy in order to evaluate the relationships between two of the source variable components (societal and interstate factors) and foreign behavior. The basic approach involved the investigation of these relationships for the total set of 56 states, followed by an analysis within each of the five groups: West; Closed; Large Developing; Unstable; and Poor. Each of the five years (1966-1970) was analyzed separately, followed by an aggregated analysis in which all five years were combined.

This initial effort to operationalize our comprehensive framework for the comparative analysis of foreign policy behavior produced several noteworthy propositions:

- Interstate factors are generally more predictive of foreign policy behavior than societal factors; this finding is supported in the separate analyses of the two clusters and in the direct relative potency test.

- The strategy of classifying states is not as productive as we had originally expected. Generally, grouping states does not exert an impact of any discernible magnitude.

- Constructive diplomatic behavior sent is better predicted than non-military conflict sent. The action-reaction model is more valid for characterizing such behaviors are "comment," "agree," and "request." Non-military conflict actions -- such as "threaten," "expel," and "seize" -- are not predicted with equivalent accuracy. Part of the discrepancy may be attributable to the fact that diplomacy is a very structured process of interaction. Conflictual acts received are less routine and therefore offer more discretion to decision-makers.

While the preliminary relative potency test compared only two variable clusters, the more sophisticated model incorporated three components: the societal; interstate; and global. The societal component remained the same. The indicators of interstate economic relations were expanded from one to eight, while the action-reaction or behavior received variables were excluded form the analysis.[6] The variables from the global component were also introduced into the analysis. The state classification scheme continued to function as the intervening variable domain. The research design is portrayed in Figure 2-7.

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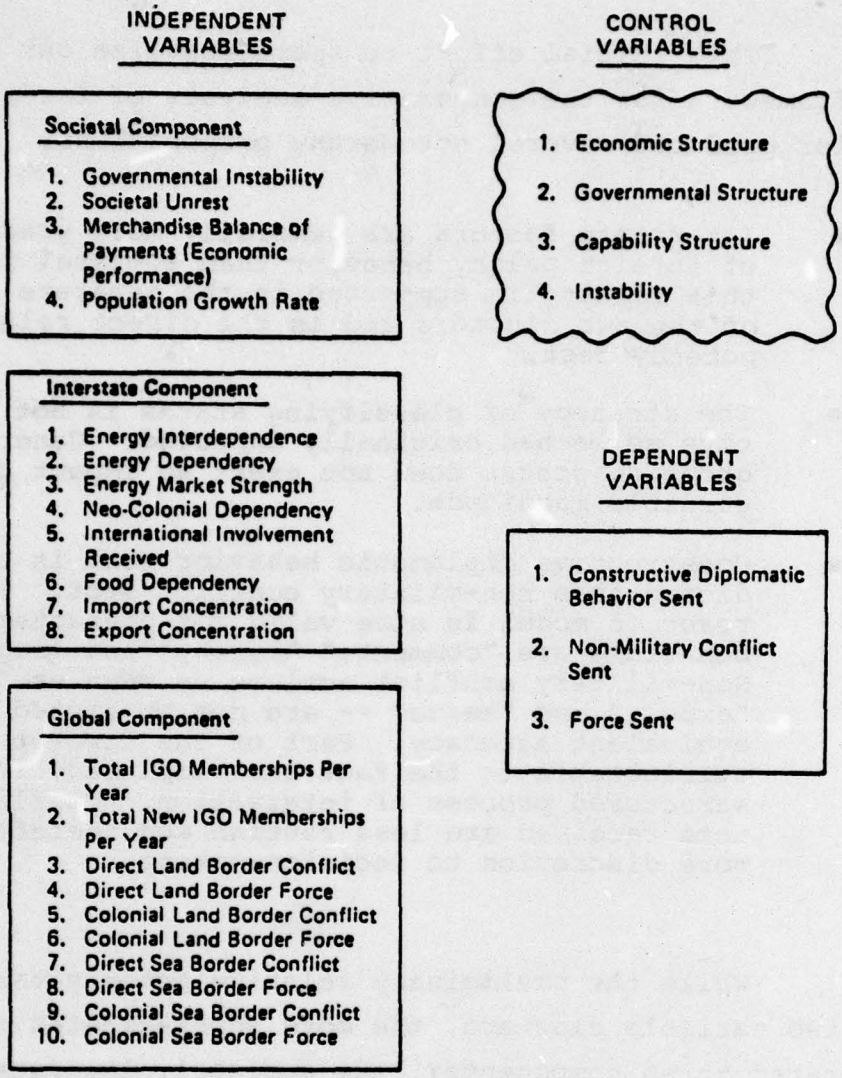
[6]Appendix B in Wilkenfeld et al. (1978a) reports parallel findings for a model which included the three behavior received variables; see also Section 6.2.2 below (pp. 241-251).



RESEARCH DESIGN

Figure 2-7

The results for the NIPALS modelling strategy are presented in a series of tables in Wilkenfeld et al. (1978a). Initially, parameters for the manifest variables were identified. The next step involved the introduction of the control for type of state, based on structural characteristics. A second set of parameters -- between the societal, interstate, and global latent variables and foreign behavior in general

-- was estimated. Finally, we singled out the types of foreign behavior which are best explained by the model and ascertained the relative potency of each of the latent variables for each of the 56 states in the analysis.

In general, the interstate cluster is the most potent determinant of foreign behavior for most states, followed by the global and societal components, respectively. Type of state, as defined by the four stable characteristics of economic structure, capability, governmental structure, and instability, mediates the relationships between the interstate and global components and foreign behavior, while the operation of the societal realm is relatively unaffected by this mediation. Overall, the model explains 69 percent of the variance in foreign behavior, with constructive diplomatic behavior and non-military conflict acts explained more impressively than force behavior.

Constructive diplomatic behavior is almost totally a product of social, economic interstate, and global determinants. The addition of the action-reaction element does not increase the 72 percent of the variance already accounted for. In contrast, the variance explained for force increases from 1 to 50 percent when behavior received is incorporated into the model. The model's ability to explain non-military conflict improves from 47 to 61 percent with the introduction of the action-reaction element.

Hopefully, the research which emanated from the IBA Project provides the foundation for more sophisticated causal models and -- eventually -- for a genuine theory of foreign behavior. Aside from issues of theory and analytical strategy, the policy-relevant applications of the basic IBA work should be illuminated. One application is that the central variables of the IBA framework have been treated as a core indicator

system in the context of the CNCI Project. This theme will be highlighted in Chapter 3 of this Report.

2.3 Crisis Analysis

Crisis analysis has experienced unprecedented expansion in recent years. Among the signs of intellectual vigor in a subfield of political science is the appearance of propositional inventories. From Hermann's (1972a) landmark collection of crisis research, Hermann and Brady (1972) extracted 311 disparate propositions. In the more delineated sphere of psychological and social psychological studies which pertain to crisis management functions, Shapiro and Gilbert (1975) amassed 81 discrete empirically-tested hypotheses. Lengthy bibliographic essays (e.g., Parker, 1977a) and special issues of journals (e.g., R. Young, 1977) also provide evidence of "takeoff" status in a field of inquiry. Extensive work has been completed in the arenas of data collection and analysis, hypothesis-testing, conceptualization, and framework-construction.[7]

The Parker (1977a) literature review on academic and applied crisis analysis and forecasting cites 143 sources, many of which have appeared since 1970.[8] If we measured this

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[7] See Andriole (1976), Andriole and Young (1977), Hopple et al. (1978a), Rossa et al. (1978, 1979), and Parker (1977a). Data sets are discussed in Brecher (1977c), Butterworth (1976), CACI (1978a, 1978b), Daly and Davies (1978), Hopple and Rossa (1978a), Hopple et al. (1978b), and Moore et al. (1975). Military-related crisis data sets include CNA (1977) and Blechman and Kaplan (1976); the two data bases are compared in Mahoney (1976). On frameworks, see Paige (1968, 1972), Brecher (1977c), Hopple and Rossa (1978b), Snyder and Diesing (1977). Both conceptualization and framework-construction are discussed in detail later in this report (see Chapter 5).

[8] See Daly (1978b) for more recent examples of basic and applied substantive findings.

prolific output with the McClelland (1972) indicators of volume and variety, we would undoubtedly discover that crisis research is both quantitatively impressive and diverse in character. Empirical inquiry has ranged from detailed case studies to cross-national, quantitative analyses. A *potpourri* of units and levels of analysis has been featured in crisis research designs and methodological eclecticism has been prevalent.

Events data bases, comparative foreign policy, and quantitative crisis analysis have developed simultaneously and have frequently been integrated into a single research design. Interestingly, Charles McClelland, the undisputed progenitor of the events data movement in international relations, has devoted a considerable portion of his efforts in the period since the middle 1950's to the quantitative analysis of crises. Charles Hermann, a prominent exponent of both events data analysis and the comparative study of foreign policy, is also one of the foremost crisis analysts. Michael Brecher, who constructed a major framework for the comparative analysis of foreign policy decision-making, has recently applied the framework to empirical case studies of crisis behavior.[9]

Empirical, conceptual, and theoretical aspects of crisis analysis will be treated in detail in Chapters 4, 5, and 6 of this Report. At this point, it is crucial to recognize that quantitative, comparative crisis analysis requires a valid, reliable system of indicators. As Burgess and Lawton (1972: 69) note in their discussion of events data bases as potential indicator systems, such systems in the life, physical, and social sciences have been designed to serve one or more of the following functions:

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[9]See Hopple and Rossa (1979) for details.

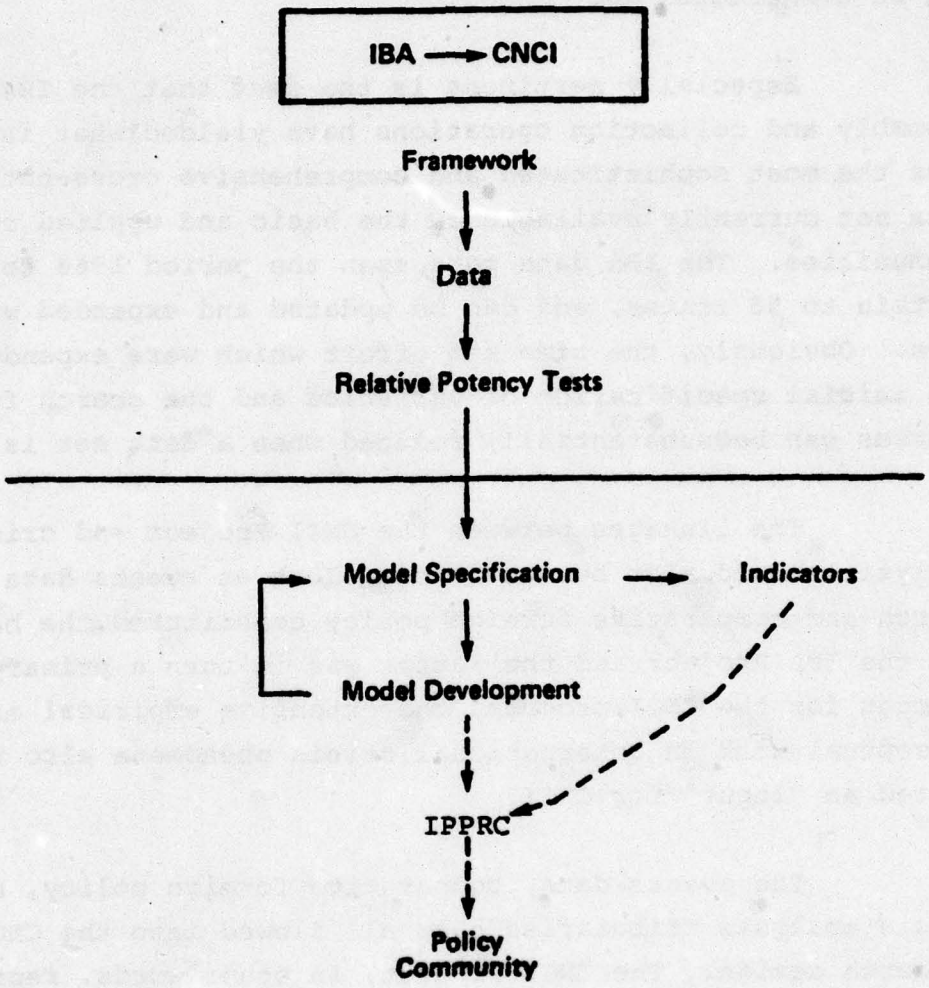
- To monitor the performance of a system;
- To evaluate the performance of a system;
- To generate early warning signals of a system's probable future performance;
- To provide performance feedback so that system guidance, steering, or redesign can be achieved.

Central to the design and implementation of indicator systems is the idea of a social, biological, or physical purpose. A comprehensive, multitiered system of crisis indicators (i.e., crisis indicators per se as well as indicators of crisis attributes, precipitants, and preconditions) will be atheoretical -- since no genuine theory of crisis exists. But the indicator system will not necessarily be ad hoc; the discussion of foreign affairs indicators in the following chapter represents an attempt to devise a comprehensive set of internal and external monitoring and warning tools. The system is applicable to foreign behavior generally and crisis behavior specifically.

2.4 The IBA-CNCI Nexus

Figure 2-8 graphically portrays the major stages of the IBA and CNCI Projects and illuminates the nature of the nexus between the two. As noted in Section 2.2, the IBA Project shifted from the stage of framework design to the task of data assembly and collection and finally to the phase of conducting relative potency assessments. These activities provided the foundation for the less basic (or structured basic) CNCI research program (described above in Section 1.4).

The IBA classificatory scheme of interstate actors is a core component of the envisioned CNCI indicator system. Similarly, the four general sources of external behavior -- psychological, societal, interstate, and global -- comprise the initial variable base for the CNCI Project's preliminary



The Transition from IBA to CNCI

Figure 2-8

work on indicator specification and construction. Finally, the IBA Project's analytical endeavors offer a firm foundation on the basis of which more sophisticated causal models can be constructed and tested.

Especially pertinent is the fact that the IBA data assembly and collection operations have yielded what is perhaps the most sophisticated and comprehensive cross-national data set currently available to the basic and applied research communities. The IBA data sets span the period 1966 to 1970, pertain to 56 states, and can be updated and expanded with ease. Obviously, the time and effort which were expended in the initial specification of variables and the search for data sources can be substantially reduced when a data set is updated.

The linkages between the CNCI Project and crisis analysis should also be mentioned. Just as events data research and comparative foreign policy constituted the bases for the IBA Project and the latter was in turn a primary impetus for the CNCI program, the extensive empirical and conceptual work on international crisis phenomena also represented an "input" for CNCI.

The events data, comparative foreign policy, and crisis analysis tributaries have all flowed into the CNCI research design. The CNCI Project, in other words, represents a synthesis of several related research traditions in basic international relations inquiry. These traditions have provided the foundation for both this research endeavor and other projects in the Crisis Management Program. The EWAMS Project, for example, has been an outgrowth of the pioneering research of McClelland. The dual DARPA/CTO objectives of applying basic research and integrating clusters of research activities (see Chapter 1) are both reflected in recent and ongoing sponsored research efforts.

3.0 INDICATOR SPECIFICATION AND DATA COLLECTION

The international relations data base has experienced unprecedented growth in the last two decades. Especially during the 1960's, considerable amounts of time, effort, and money were expended in order to collect reams of data about phenomena of interest to analysts of international politics and foreign policy. While theoretical purists quite properly castigated the more mindless manifestations of brute empiricism, it is undeniable that the theoretically-oriented researcher now has access to a data base which is large, relatively comprehensive, and sufficiently varied substantively and temporally that increasingly more sophisticated analytical strategies can be applied. Perhaps the richest single data base in quantitative international politics is WEIS, which currently constitutes the empirical foundation for the Early Warning and Monitoring System.[1]

3.1 International Affairs Indicators

WEIS and other events data sets comprise only one type of data in the field of international relations. Also pertinent are various aggregate data sets which contain political, military, economic, social, cultural, and demographic variables as well as scattered quantitatively-based content analysis, elite biographical, and interview data collections. Furthermore, most of these data sets are available to researchers through the Inter-University Consortium for Political and Social Research (ICPSR) at the University of Michigan; DARPA/CTO and other agencies and institutions have transferred data sets to ICPSR. Aside from numerous country-specific election studies, among the relevant recent acquisitions are (see ICPSR, 1978):

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[1] See Sections 2.1 (pp. 19-26) and 4.1 (pp. 128-132).

- Gurr's Civil Strife Events data, 1955-1970;
- Gurr's Civil Strife Conflict Magnitudes data, 1955-1970;
- International Monetary Fund, Directions of Trade Data, 1948-1977;
- International Monetary Fund, International Financial Statistics, 1948-1977;
- Kaplan and Blechman's Political Uses of the U.S. Armed Forces data set, 1946-1976;
- McClelland's WEIS Project data, 1966-1977;
- National Bureau of Economic Research, Macroeconomic Time Series for the U.S., United Kingdom, Germany, and France;
- Ruth Leger Sivard's World Military and Social Expenditures, 1977 and 1978;
- United Nations, Cross-National Population by Age and Sex, 1966-1974.

While there is obviously an abundance of data sets which can be used for constructing international affairs indicator systems, the really troublesome issues revolve around two more fundamental questions. First, what function or functions should be served by such a system? Secondly, what are the criteria for evaluating an indicator system?

The need for an international relations (IR) indicator system should be obvious, given the inadequacy of personal experience for evaluating and planning international policy. In a trenchant discussion of IR indicators, Davis Bobrow notes:

> The effects of international relations policies are rarely obvious, simple, or particularly direct. The number and internal complexity of relevant actors is high; their resemblance to other actors is often low; their ties to any common decision center or resource allocation system are very tenuous. In addition, habits of secrecy often lead actors to deliberate efforts to conceal the links between stimuli and responses. These characteristics combine to make it very difficult to extract common features from the apparently very diverse paths along which the statements and actions flow [1969: 2].

The functions or purposes of an IR indicator system are less obvious. As was noted in our discussion of IR crisis indicators in Section 2.3,[2] Burgess and Lawton (1972: 69) catalogue four distinct potential functions of indicator systems in the physical and social sciences: monitoring the performance of a system; evaluation; providing early warning signals; and producing performance feedback information.

Given the embryonic nature of IR indicator development, it would be premature to posit fully articulated evaluation and feedback functions. As with the EWAMS indicators, we can subdivide the purposes of the CNCI indicator system into three categories:

Information retrieval ➤ monitoring ➤ warning.

There are transitions from information retrieval to monitoring or tracking to warning, as Daly and Davies (1978: 37-38) clearly recognize. Furthermore, the danger always exists that an indicator system will be arrested at the information retrieval or monitoring stage. An IR indicator system that satisfied the criteria of comprehensivess, validity, and reliability would be very attractive as a means of systematizing the storage and display of masses of data and facilitating the charting of trends and patterns. The threshold from monitoring to warning is much more formidable than the one which separates information retrieval and monitoring. Given the range and generality of the components in the CNCI indicator system and the more extensive experiential base for assessing the performance of the EWMAS indicators, the development and testing of a CNCI warning or forecasting capability will be fairly distant in a temporal sense. However, the system's ability to monitor international affairs has already been explored and the initial results are encouraging.[3]

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[2]See pp. 39-40.

[3]See especially Wilkenfeld et al. (1979).

To a great extent, the criteria for evaluating an indicator system are exceedingly pragmatic in nature: how does the system "work" in practice? Bobrow's (1971: 18-23) analogy between the current state of IR research and that of economics at the time when the National Bureau of Economic Research (NBER) was founded is pertinent.[4]

Wesley C. Mitchell, who established the Bureau, was concerned with "facts which would make a social difference [Bobrow, 1971: 19]." The real problems were perceived in dynamic rather than static terms. While deductive theory was hardly a panacea -- because of its limiting assumptions -- "correlation mania" (searching huge matrices of correlation coefficients for "relevant" findings) was not the answer either; as a general rule, statistical analysis should be employed to probe theories and uncover significant causal interconnections. The intensive scrutiny of a few salient problems was favored over a scattergun strategy of tackling every issue in the domain of concern. Most significantly, the NBER's developmental curve was not smooth and linear; several decades antedated the high status which the Bureau subsequently achieved.

Extensive work has accrued in the realms of economic and social indicators.[5] The comparable IR efforts are more limited in scope and certainly less impressive in terms of results.[6] In his essay in Land and Spilerman (1975), Land classifies indicators into three areas:

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[4]The following paragraph is a synopsis of Bobrow's (1971) discussion of the NBER; on Mitchell, see the sources cited in note 6 of Bobrow (1971: 25).

[5]See, for example, Bauer (1966), Land and Spilerman (1975), and Liu(1976).

[6]See Deutsch (1960) and Rummel (1969). DARPA-supported work in this area includes Calhoun et al. (1974), Martin (1976), Rubin et al. (1972), and Spector et al. (1975).

- Output descriptive indicators (measures of end products of social processes);
- Other descriptive indicators (social conditions);
- Analytic indicators (components of explicit conceptual models of social processes).

IR indicators tap the first two but neglect the third dimension.

Bobrow (1969) delineates four critical aspects of building an indicator system. These include point, models, indexes, and data. While the last has received primary emphasis in IR indicator work, the others are equally vital.

- Point refers to the set of normative objectives which constitutes the driving force of the system.
- Models in indicator systems are designed to serve social (rather than scientific) goals and should therefore be complex (since the system is an applied or engineering system) and sensitive to specific and historical considerations.
- Indexes yield values which provide the parameter values for models; indexes link output from an indicator system to the selection of means to achieve normative objectives.
- Data requirements are determined by indexes.

An indicator system is cascaded in the sense that:

Point ⟶ Models ⟶ Indexes ⟶ Data.

It could be charged that the sequence in IR indicator delineation has been the reverse of the postulated pattern -- or even that data availability has been the primary determinant of the inputs which go into the indicator system. Furthermore, as Bobrow (1969) emphasizes, mapping (time-bounded descriptive profiling) and hypothesis-testing have prevailed over model building.

Mapping stresses parsimony in accounting for variance, a largely irrelevant consideration in indicator system engineering efforts; hypothesis-testing exposes isolated relationships, an approach which does not provide a foundation for acquiring knowledge of complex processes.

The driving force of any indicator system, as Bobrow (1969) notes, is the set of normative objectives. Especially crucial are the tasks of ranking objectives and operationally defining objectives in a scalar fashion. Neither of these prerequisites has really been achieved in applied work on indicators of general IR phenomena, crises, and conflict processes. This gap makes it especially difficult to undertake efforts at model construction which feature a control theory focus.[7]

The potentially conflicting goals of crisis warning and management also pose problems for developing and applying IR indicator strategies.[8] If forecasting is viewed exclusively as a means of improving the management process, then the ranking issue becomes less problematic. If, however, the goal of averting crises is deemed to be relevant, then the warning/management dichotomy is especially troublesome.[9]

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[7]For example, see Gillespie et al. (1978).

[8]Within the warning domain, the monitoring/warning feedback loop must also be considered. The two are "separate but linked components of a single process and thresholds [must therefore] be given a dual role...[Daly and Davies, 1978: 18]." Also relevant is Daly (1978a).

[9]Alternatively, the goal may be to exploit crises or to at least view crisis situations as stimuli which offer both dangers and opportunities. The minority crisis-as-opportunity perspective is mentioned in Robinson (1972) and emphasized in Milburn (1972); the restricted U.S. emphasis on the containment and isolation of crises is contrasted with the Chinese view in Bobrow et al. (1979). As the latter authors point out, the Chinese regime perceives domestic crises in "reactionary" systems as opportunities.

The normative objectives in IR indicator system building are almost invariably implicit and amorphous. Avoiding or minimizing the danger of crises (or of conflict or war) is a central -- but diffusely articulated -- social goal. However, decision-makers almost invariably seek to achieve more than war avoidance:

> They also want to advance or protect their state's interests, to win or at least to maximize gains or minimize losses, and if possible to settle the issue in conflict so that it does not produce further crises....The problem [of crisis management] is to find the optimum accommodation in the particular crisis context, given the distribution of values and military power among participants [Snyder and Diesing, 1977: 207].

Thus, the initial problem revolves around the dual preliminary tasks of articulating and ranking goals. Both issues are inescapably controversial.[10] Further, the specific objectives and ranking will affect the domain of relevant indicators (as well as models and indexes). In addition to specifying the purpose(s) or function(s), then, it is crucial that architects of IR indicator systems identify the relevant normative objectives and the assumed hierarchy of values.

IR indicator models are even fuzzier in conception than normative objectives. Models in social indicator research are more clearly specified and have even been subjected to some application (see Land and Spilerman, 1975). As Bobrow (1969) points out, models presume a set of objectives and are designed to be sensitive to specific and historical considerations as well as complex in nature.

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[10]Consider, for example, the goal specifications and rankings which would be posited by the well-known nuclear pacifist and nuclear strategist camps.

Our Partial Least Squares (PLS) modeling strategy at least provides a general way to rank indicators and indicator clusters.[11] In addition, PLS is specifically geared to situations of high complexity and soft information, a state of affairs which characterizes both indicator systems per se and basic and applied IR research. Finally, the approach permits the derivation of state- and region-specific profiles, which is clearly necessary for indicator system models.

Our indexes fail to meet Bobrow's (1969: 8) exacting validity-related standards. However, the indexes represent both statistical reduction (primarily factor analysis) and concept formation strategies. The latter is more applicable to the state attribute data whereas the former characterizes our index-construction efforts in the behavior sent and received domains.[12] The other indicator realms are treated as discrete items (manifest variables) and more general clusters (latent variables); this point will be developed in detail in Chapter 6.

The data in the CNCI indicator system at least represent the results of prior conceptualizing rather than the dictates of data availability. Of Bobrow's (1969: 10-11) three evaluative criteria of efficiency, comparison, and distortion, the second is most satisfactorily fulfilled. The data represent 77 states for 10 years (1966-1975), can be easily updated and extended to other actors, and provide at least limited time series options. While the data cannot be disaggregated below the national level, nation, dyad, region, and system options are all available (both cross-sectionally and diachronically); the ability to use the data for a variety of indexing purposes enhances the relevance

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[11] PLS is described later in Section 6.2.1 (p. 234) and in detail in Appendix E.

[12] However, the dimensionalizing results conform to concept formation expectations. On the behavior domains, see Section 3.5.2 (pp. 103-107); Section 3-6 (pp. 110-115) discusses the state attribute data.

of the efficiency standard. Finally, distortion is minimized in the sense that systematic missing data problems are rare.[13] Other DARPA/CTO-sponsored projects are generating expert-based data, which is not a feature of the CNCI data sets.[14] The variables and indices which comprise the CNCI indicator system are described in detail in this chapter; see also Appendix A and Rossa (1978a).

Compared to the situation a decade ago, IR indicator systems work is at the adolescent stage -- although from the vantage point of economic and social indicators, international affairs indicators would undoubtedly appear to be at an even less "mature" stage than adolescence. However, we are perhaps at the take-off stage in terms of delineating objectives and constructing models and indexes. The data base is impressively large and relatively sophisticated -- at least vis-a-vis the state of affairs two decades ago. The remainder of this chapter will describe the existing indicators, pinpoint the major lacunae, and discuss a prototype system in the neglected realm of internal indicators.

3.2 Expansion of the State Sample[15]

The data set for the IBA Project, which constitutes the basis for the CNCI Project, is comprised of data on 56 states for the period 1966 to 1970. The decision to select 56 cases from the "universe" of states was the product of an intentional compromise between two equally undesirable options. One option was to include all states in the international system. This choice would have imposed a massive data collection task and would have

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[13] By restricting the sample to the 77 most active countries, we automatically minimized missing data problems.

[14] Among these efforts are McClelland's (1978a, 1978b) D-files and George Duncan and Brian Job's elicitation of subjective probability estimates regarding the Middle East.

[15] See Daly and Hopple (1977).

generated serious missing data problems. The other option -- the selection of a very small sample -- would have severely constrained the ability to formulate generalizations about a significant number of states.

The IBA researchers decided to adopt 40 events as the minimum criterion for inclusion in the state sample. If a state failed to generate at least 40 events during a period from 1966 to 1969, it was excluded from the sample. The "major" foreign policy actors were thus automatically included. Furthermore, various types of states were represented. While the IBA "sample" was clearly not "random" and the inclusion criterion was somewhat arbitrary, there is appreciable heterogeneity in the list of states. However, it is obvious that very minor states or "microstates" are completely ignored. But the variation on such classificatory dimensions as geographical region, power/capability, economic structure, and type of polity is considerable.

The Early Warning and Monitoring System Project at IPPRC utilizes the World Event/Interaction Survey (WEIS) data set, which consists of international events exchanged among 185 states and other international actors for the time span from January, 1966 to the present. Since the CNCI and EWAMS Projects are involved in the processes of jointly developing and testing indicators of intrastate crises, examining the relationships of these indicators with those of international crises, and integrating the indicators into an interactive computer-based crisis early warning and monitoring system, it was necessary to increase the compatibility of the CNCI and WEIS data sets by expanding the state sample from 56 to about 75 or 80.

Several criteria guided the state sample expansion decision: 1) The needs of potential users of the monitoring and forecasting system; 2) Changes in sources of potential crises between the ten year period 1966 to 1975 and the period since as reflected by an indicator called ROZ; 3) Testing requirements of

participants in the Cybernetics Technology Office (CTO) Crisis Management Program; and 4) Data availability.

3.2.1 Needs of Potential Users. One of the goals of the joint effort of the CNCI and EWAMS Projects is to transfer a fully integrated crisis early warning and monitoring system to the user community. The needs of potential users therefore constituted a primary criterion in selecting states to be added to the data set.

In addition to the original 56, entities of primary interest to a national level I&W command include the Berlins, North Korea, and current or recent hot spots which can be expected to remain controversial or explosive (e.g., Rhodesia, Zimbabwe, Angola, the Horn of Africa countries).

Of primary interest to a theatre level command such as NAVEUR would be (aside from the states in the existing sample): Iceland; Norway; and Malta. Of secondary interest to NAVEUR are: Finland; Luxembourg; Switzerland; Austria; and countries which border the Mediterranean, Red Sea, and Persian Gulf.

3.2.2 ROZ.[16] For purposes of the present effort, we can define ROZ ("row percentages and column z-scores")[17] as an indicator of a country's monthly activity which takes into consideration the state's share of total world activity and changes in that proportion as compared to a previous period. The goal of technology transfer requires current or "real-time" data with monthly, weekly, and even daily updates. ROZ is a way of assuring that a sample of 80 states is likely to contain those states of interest to the user community now and in the future rather than the ones which were active during the decade between 1966 and 1976. Several of these states no longer even exist.

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[16] For details on the methodology on which this indicator is based and an illustration of its substantive use, see McClelland (1976) and Daly and Wittmeyer (1977).

[17] See McClelland (1976: 16-18).

As illustrations of the impact of applying the ROZ criterion, it can be noted that both Rhodesia and Zimbabwe were very active between January 1976 and March 1977.[18] Rhodesia's ROZ broke the danger level of 50 twice in the 15 month period and approached it once while Zimbabwe broke 50 once and came close once. Not surprisingly, the high ROZ's for the two entities occurred in the same months. Since at least January of 1976, Rhodesia and Zimbabwe have been both much more active and more potentially "troublesome" for the world than they were in the preceding 10 years. In that period, Zimbabwe accounted for no more than .1 percent of the world's activity while its average percent for the fifteen months between Janaury 1976 and March 1977 was 2.41. Rhodesia exhibited a similar change with a 10 year average of .2 percent and a fifteen month average of 3.25 percent. ROZ, which registers such dramatic changes, was therefore used as a criterion for determining which states are or will be added to the CNCI sample.

To generate a list of 30 potential additions, monthly ROZ's were produced for all 185 countries from January 1976 to March 1977.[19] States were ranked on the basis of average ROZ scores and average percent for the 15 month period and with the original sample of 56 removed. This yielded lists of states which were most active (excluding the original 56) vis-a-vis both the rest of the world and their own past behavior and which should consequently be monitored as potential sources of trouble. The lists were therefore used -- along with considerations of user needs, testing requirements, and data availability -- to increase the Cross-National Crisis Indicators Project sample.

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[18]The data are displayed in tabular form in Daly and Hopple (1977: 6).

[19]The ROZ's were generated with a standalone (no host computer) Tektronics 4051 graphics terminal and a 4631 hard copy unit. The program was written by Jim Wittmeyer with the assistance of Brenda Bell, both of whom contributed valuable suggestions to the logic of using ROZ in this context.

3.2.3 Testing. Most states of interest to participants in CTO's Crisis Management Program are included in the list of 30 which was generated by the user interest and ROZ criteria. Participant testing requirements (e.g., the addition of North Korea to allow dyadic testing with South Korea) were essentially redundant, but did provide a useful check on our quantitative criterion.

3.2.4 Data Availability. Prior experience has demonstrated that the missing data constraint becomes especially problematic in the case of small, insignificant states. As noted above, the IBA Project intentionally excluded such states from its list of 56. As a result, relatively full data sets have been amassed for such realms as state characteristics, societal variables, interstate factors, and global sources of state behavior. Since the CNCI/EWAMS research effort will entail an updating and significant expansion of the various data sets, it was decided to continue to exclude states which account for an infintesimal proportion of international activity.

3.2.5 New Sample for the Cross-National Crisis Indicators Project. Twenty-one countries were added to the original 56. The new Cross-National Crisis Indicators Project sample is presented in Table 3-1.[20] Asterisks denote states which were not in the original sample. The list is the product of EWAMS and CNCI analysis and discussion of the preliminary lists generated by user needs, ROZ, and testing requirements as constrained by data availability. While several intuitively desired states were omitted (e.g., Norway, Finland, and Switzerland), we concluded that the inclusion of these and other states below the cutoff would have increased the list to an unmanageable size. In terms of the magnitude of the data collection task, a sample of 80 states is probably the maximum.

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[20] In generating the actual list, we discovered that the optimum quantitative inclusion criterion was .15 percent. In other words, a state was included if it accounted for at least .15 percent of all WEIS events for the 1966 to 1975 time span. It should be noted that 12 states in the original sample failed to reach the cutoff; however, all 12 will be retained in the new list so that we can examine trends and patterns over time for the original 56. Such findings would be of potential utility from both basic and applied research perspectives.

State	No. Code	Letter Code	State	No. Code	Letter Code
Western Hemisphere:					
1. United States	002	USA	40. Ethiopia	530	ETH
2. Canada	020	CAN	41. Zambia *	551	ZAM
3. Cuba	040	CUB	42. Rhodesia *	552	RHO
4. Mexico*	070	MEX	43. Mozambique*	565	FRE
5. Panama *	095	PAN	44. South Africa	560	SAF
6. Venezuela *	101	VEN	45. Angola *	561	ANG
7. Brazil	140	BRA			
8. Chile	155	CHL	**Middle East:**		
9. Argentina *	160	ARG			
			46. Morocco *	600	MOR
Europe:			47. Algeria	615	ALG
			48. Libya *	620	LBY
10. United Kingdom	200	UNK	49. Sudan*	625	SUD
11. Netherlands	210	NTH	50. Iran	630	IRN
12. Belgium	211	BEL	51. Turkey	640	TUR
13. France	220	FRN	52. Iraq	645	IRQ
14. Spain	230	SPN	53. United Arab Rep.	651	UAR
15. Portugal	235	POR	54. Syria	652	SYR
16. West Germany	255	GMW	55. Lebanon	660	LEB
17. East Germany	265	GME	56. Jordan	663	JOR
18. Poland	290	POL	57. Israel	666	ISR
19. Austria*	305	AUS	58. Saudia Arabia	670	SAU
20. Hungary	310	HUN	59. Yemen	678	YEM
21. Czechoslovakia	315	CZE	60. Kuwait*	690	KUW
22. Italy	325	ITA			
23. Albania	339	ALB	**Asia:**		
24. Yugoslavia	345	YUG			
25. Greece	350	GRC	61. China	710	CHN
26. Cyprus	352	CYP	62. Taiwan*	713	CHT
27. Bulgaria	355	BUL	63. North Korea *	731	KON
28. Rumania	360	RUM	64. South Korea	732	KOS
29. USSR	365	USR	65. Japan	740	JAP
30. Sweden	380	SWD	66. India	750	IND
31. Denmark	390	DEN	67. Bangladesh*	765	BGD
32. Iceland *	395	ICE	68. Pakistan	770	PAK
			69. Thailand	800	TAI
Africa:			70. Cambodia	811	CAM
			71. Laos	812	LAO
33. Ghana	452	GHA	72. N. Vietnam*	816	VTN
34. Nigeria	475	NIG	73. S. Vietnam	817	VTS
35. Zaire	490	COP	74. Malaysia	820	MAL
36. Uganda *	500	UGA	75. Philippines	840	PHI
37. Kenya	501	KEN	76. Indonesia	850	INS
38. Tanzania *	510	TAZ			
39. Somalia*	520	SOM	**Oceania:**		
			77. Australia	900	AUL

LIST OF STATES

Table 3-1

The list in Table 3-1 represents an intentional balance among user needs and preferences, strictly objective criteria, and research capabilities. The addition of the 21 states will facilitate the development and testing of intrastate and interstate indicators for crisis warning, monitoring, and management and will enhance the development, testing, integration, and application of the DARPA/CTO Early Warning and Monitoring System.

3.3 Development of the Intrastate Indicator System

3.3.1 Overview of the Problem. In the domain of international political analysis, (external) crisis research has obviously emerged as a viable subfield. The proliferation of case studies, frameworks, propositional inventories, panels at professional meetings, special issues of journals, and other signals demonstrate the validity of this assertion. Unfortunately, comparable activity has not characterized the study of domestic crisis (or internal affairs generally). Figure 1-2 (p. 7) identifies the range of crisis indicators as one which spans the continuum of static and dynamic internal and external indicators.

Recent inquiry, however, has at least generated an impressive number of theoretical frameworks and empirical propositions in the amorphous realm of "internal conflict" and "aggressive participation."[21] Such research has obvious potential relevance to the study of indicators of domestic crisis behavior. The efforts of the IBA Project to conceptualize internal phenomena in terms of two broad variable cluster areas (individual-level and societal forces) are also relevant to the delineation of CNCI intrastate indicators.

3.3.2 Psychological Indicators. This label is really a shorthand expression for individual-level or elite characteristics

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[21] See especially Feierabend et al. (1972); Gurr (1970); Hibbs (1973); and Muller (1977).

which can be expected to impinge upon crisis anticipation and decision-making processes. While most of the research has concerned psychological factors, Wiegele (1978b) and others have attempted to extend this indicator cluster to an array of biological, physiological, and psychophysiological indicators.[22]

The psychological realm constitutes a fascinating area of inquiry for the crisis analyst.[23] The psychodynamic patterns, personality traits, and belief systems of elite decision-makers all presumably influence the major decision stages which culminate in the process of choice specifically and in formulating (and implementing) foreign policy generally. Given the impact of high-level elites in the context of a foreign policy crisis,[24] political psychology represents a fruitful vantage point for analyzing the sources of and decision-making processes associated with crisis phenomena.

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[22]The literature is reviewed briefly in Hopple and Favin (1978) and extensively in Somit et al. (1978); see also Somit (1976). On Wiegele's work, see Center for Biopolitical Research (1978a, 1978b), Hopple (1978: 4-5), and Wiegele (1978a).

[23]Shapiro and Gilbert's (1975) comprehensive literature review suggests that individual (psychological) and small group (social psychological and sociological) research thrusts are clearly relevant to the task of crisis management. The literature on psychology and foreign policy analysis is discussed in detail in Hopple (1978); recent studies are reviewed and abstracted in Hopple and Favin (1978). See also Falkowski (1979), Hermann (1977, 1978), Holsti (1976, 1977). Marvick reviews the research in the general field of "elite studies;" an excellent example which pertains to the Chinese elite and foreign policy is Bobrow et al. (1979). Greenstein (1975) explores the interface between psychology and politics.

[24]For a useful summary of the research findings concerning the impact of the individual actor (i.e., the high-level elite decision-maker or decision-making unit) upon foreign policy behavior and decision processes, see Hermann's (1976) catalogue of propositions; see also Holsti (1976) for a discussion of the circumstances which enhance or maximize the impact of the decision-maker's beliefs and other personal characteristics.

For the purpose of cross-national analysis in the context of a comprehensive crisis indicator system, the CNCI psychological domain features a data set which was originally collected in order to operationalize the psychological component of the IBA framework. The case study literature in the area of foreign policy elite analysis is both voluminous and unsystematic.[25] The explicitly quantitative, cross-national work is almost nonexistent.[26] The IBA data collection operation adopted content analysis as a research technique and concentrated on the value subsystem of a decision-maker's belief system as the substantive focus of inquiry.[27]

The psychological indicators data set includes two distinct elements: decision-maker values and decision-maker characteristics. In both instances, data have been amassed for the foreign policy elite of the state (i.e., the head of state and the foreign minister). The value data are described in more detail below; elite attribute data were collected from the Political Handbook and Atlas of the World, International Yearbook and Statesman's Who's Who, and other sources. On the use of elite characteristics data in cross-national inquiry, Quandt (1970) is especially useful.[28] The specific variables are listed below.

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[25]George and George (1964) is the best example of a psychodynamic or depth-psychological case study of a particular actor; operational code case studies include Johnson (1977), Walker (1977), and the sources cited in Holsti (1977); various cognitive mapping case studies are included in Axelrod (1976); a system-specific case study which uses a melange of research strategies is Bobrow et al. (1979).

[26]A noteworthy exception is the work of Hermann (1974, 1975, 1978); for other examples, see several chapters in Falkowski (1979).

[27]Details are provided in Hopple (1977, 1978, 1979); see also Rokeach (1973); for another example of empirically applying a value inventory approach, see Searing (1978).

[28]The CNCI elite attribute data exist for all 77 states for the 1966-1975 time span; the data have not yet been analyzed in a detailed fashion.

- **Decision-Maker Values**

1. A comfortable life
2. A world of peace
3. Equality
4. Freedom
5. Happiness
6. Governmental security
7. Honor
8. Justice
9. National security
10. Public security
11. Respect
12. Social recognition
13. Wisdom
14. Progress
15. Unity
16. Ideology
17. Cooperation
18. Support of government

Elite Attributes

1. Age
2. Education
3. Occupation

The 18 values are derived from Rokeach's (1973) list of universal values and from exploratory research; the last 5 foreign policy-specific values in the list above were added as a result of preliminary content analyses of the source material. The source for speech material was the Daily Report of the U.S. Foreign Broadcast Information Service (FBIS). The Daily Report consists of material which is obtained through U.S. monitoring of foreign broadcasts. For the United States, the Department of State Bulletin constituted the source.

In order to determine the annual state samples for the 1966 to 1970 period, coders generated lists of heads of state and foreign ministers for all 56 states in the original sample and then recorded all Daily Report speeches (interviews, broadcasts, etc.) by the decision-makers. For each year, states for which there were three or more "cases" (i.e., speeches by the head of state and/or foreign minister) were included. A total of 39 states satisfied this criterion one or more times during the 1966 to 1970 time span. The annual samples varied from 31 states (1966, 1967) to 20 states (1969). Currently, the data exist only for the 39 states for the 1966 to 1970 period.

Fourteen states were in all five annual samples; these included Cuba, Czechoslovakia, the United Arab Republic, Jordan, Israel, China, and South Vietnam. Generally, the state samples overrepresented the Middle East and the Communist states.[29]

Preliminary descriptive patterns and analytical results for the value data set appear in Hopple (1977, 1978, 1979). Overall means and standard deviations (aggregated across all countries and years) are provided in Table 3-2. Eight values have means above 1:

- A world of peace
- Freedom
- National security
- Public security
- Progress
- Unity
- Ideology
- Cooperation

Especially noteworthy is the mean of 4.54 for the value progress. The values with the lowest means are wisdom, social recognition, equality, and respect. Empirical findings are summarized below in Hopple (1979) and in Wilkenfeld et al. (1978a).

Subsequent analysis will be necessary in order to assess the value data set. The Rokeach value approach as applied to the psychological or elite component of the CNCI IR indicator system constitutes a parsimonious, flexible, and potentially viable strategy for content analyzing public documents and generating indicators at this neglected level of analysis.

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[29]See Hopple (1977, 1978) for details regarding the research design and annual state samples.

VALUE MEANS AND STANDARD DEVIATIONS (1966-1970)

Value	Mean	Standard Deviation
A comfortable life	.66	1.01
A world of peace	1.74	1.80
Equality	.34	.53
Freedom	1.60	1.36
Happiness	.47	.65
Governmental security	.65	.61
Honor	.47	.53
Justice	.63	.69
National security	2.32	1.64
Public security	1.19	1.01
Respect	.38	.36
Social recognition	.29	.43
Wisdom	.22	.51
Progress	4.54	4.16
Unity	1.52	1.30
Ideology	3.10	3.60
Cooperation	3.65	2.88
Support of Government	.77	.85

Table 3-2

Additional descriptive and analytical studies should be attempted. A variety of validation issues awaits definitive treatment. Existing findings are suggestive, however. Most problematic is the unresolved issue of the relevance of the value data for monitoring and forecasting crisis behavioral patterns. Given the plethora of obstacles to generating valid and reliable indicators of personal characteristics of IR elites, it would be advisable to continue the process of testing and evaluating the data set.

3.3.3 Societal Indicators. As the discussion of intra-state crises in the following section will demonstrate, schemes for charting and forecasting foreign policy-relevant internal states of affairs are notoriously ad hoc and primitive in nature. No analogue to the various domestic-oriented economic and social indicator systems currently exists.

In conceptualizing and operationalizing the internal or societal variable cluster, the IBA researchers reviewed prior efforts to map this amorphous domain. The distinction between genuine variables (i.e., more dynamic phenomena which display temporal fluctuations on an annual or less-than-yearly basis) and more static attributes -- a distinction which distinguishes between the various variable clusters which are described here and in Sections 3.4 and 3.5 and the state classification scheme which is the subject of Section 3.6 -- emerged as a fundamental conceptual structuring principle in the process of delineating indicators and assigning them to clusters. Thus, more dynamic societal indicators will be identified here; the discussion of what are commonly referred to as "national attributes" (see e.g., East, 1978b) must be deferred until the section of this chapter which describes the state classification scheme component of the CNCI indicator system.

Five indicators are employed to operationalize the societal cluster. The five refer to three primary societal variable areas: economic performance (dynamically conceived); the demographic situation; and domestic conflict. Two discrete indicators tap the economic performance concept: merchandise balance of payments situation and the percentage of unemployed in the country.[30] A population growth rate variable is the only measure in the demographic area. Two sets of indicators, which

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[30]We have never used the unemployment variable in our empirical studies; the data are of course unusually sensitive politically (and therefore suspect) and there is a large number of missing data cases.

reflect civil violence and internal conflict, are labelled "societal unrest" and "governmental instability." The five specific societal indicators are listed below.

- Economic Performance
  1. Merchandise balance of payments
  2. Percentage of unemployed
- Demographic Situation
  1. Population growth rate
- Domestic Conflict
  1. Societal unrest
  2. Governmental instability

Several sets of cross-national domestic conflict time series data are available to researchers. The Banks (1971) data set appeared to be the most appropriate given our temporal and other requirements. The specific variables include:

1. Assassinations;
2. General strikes;
3. Guerilla warfare;
4. Government crises;
5. Purges;
6. Riots;
7. Revolutions;
8. Anti-government demonstrations;
9. Number of coups;
10. Number of changes in the executive;
11. Number of changes in the cabinet;
12. Number of changes in the constitution.

In an effort to generate higher-order dimensions of domestic conflict behavior, general factor analyses of the 12 indicators were performed. The correlation matrices contained very weak bivariate Pearsonian correlations, a result which revealed the general absence of a factor structure. The six analyses -- one for each year from 1966-1970 and one for the entire period -- yielded very unstable results.

The low correlations and their wide fluctuations over time were determined to be a function of the variable distributions. The events which had been coded were uncommon; most entries were zero -- even on an annual basis. With this type of discontinuous data, Pearson's r is not an appropriate measure of association and the factor analyses were consequently meaningless. Therefore, we decided to further explore the relationships among the variables by examining crosstabulations and accompanying measures of association such as gamma and tau c. The contingency tables uncovered some rather strong bivariate relationships.

In order to avoid the problem of induction from a large number of tabulations to a small number of cells, the search for patterns relied on previous empirical research in this area. Studies by Rummel (1963, 1968), Tanter (1966), Wilkenfeld (1973), Gurr (1970), Feierabend (1969), Nesvold (1971), Banks (1972), and others suggested the particular patterns and groupings that could be expected.

In addition, we produced a summary (1966-1970) crosstabulation for each pair of variables, with gamma as the measure of association. These results are presented in Table 3-3. The first group which was identified in this way isolates coups as the core variable, with changes in the executive, changes in the cabinet, changes in the constitution, revolutions, and purges also "clustered" onto this factor. This dimension has been designated governmental instability.

A second cluster consists of riots, anti-government demonstrations, and general strikes. This is obviously a less structured and more spontaneous type of dimension, and it has been designated societal unrest. Three variables -- assassinations, government crises, and guerilla wars -- exhibited no particular patterns and were not included in either of the two dimensions.

GOVERNMENTAL INSTABILITY						
	PURGES	REVOLUTIONS	COUPS	CABINET CHANGES	CONSTITUTIONAL CHANGES	EXECUTIVE CHANGES
Purges[c]						
Revolutions[a]	.50					
Coups[a]	.49	.94				
Cabinet changes[b]	.44	.59	.93			
Constitutional changes[a]	.37	.71	.98	.58		
Executive changes[b]	.30	.38	.94	.94	.67	

SOCIETAL UNREST			
	RIOTS	ANTI-GOVERNMENT DEMONSTRATIONS	GENERAL STRIKES
Riots[c]			
Anti-government demonstrations[c]	.67		
General strikes[c]	.73	.65	

[a]Dichotomized.

[b]Trichotomized.

[c]Transformed by geometric progression method.

Table 3-3

DOMESTIC CONFLICT FACTORS:
INTERCORRELATION OF DOMESTIC VARIABLES (GAMMA COEFFICIENTS)

Certain transformations were necessary because of serious skewness problems. Revolutions, coups, and constitutional changes were dichotomized, with one or more occurrences coded as 1. Cabinet changes and executive changes were trichotomized; no changes were coded as 0, one change was coded as 1, and two or more changes were coded as 2. Purges, riots, anti-government demonstrations, and general strikes were transformed by grouping according to geometric progression: 0(0); 1(1); 2-3(2); 4-7(3); 8-15(4); 16-31 (5); 32-64(6).

As the following section indicates, the use of cross-national domestic events measures to operationalize the phenomena of intrastate crises is undoubtedly restrictive and misleading. Furthermore, various conceptual, theoretical, and methodological considerations suggest unequivocally that more adequate indicators should be devised. As is frequently the case, however, convincing critiques of existing data sets can be produced much more easily than concrete directives for new indicator development and operationalization programs.

3.3.4 Intrastate Crises. In an earlier assessment of existing research on intrastate crises, Orlansky (1970: 9-10) notes that one study of internal and external conflict since World War II lists a total of 380 conflicts in the period between 1946 and 1964; 85 percent of these 380 cases, he emphasizes, were internal in nature. Of the latter, 40 percent were classified as coups, military revolutions, and mutinies; 30 percent constituted civil disorders; 12 percent were internal guerilla and civil wars.

Existing empirical research on "intrastate crises" has virtually equated the latter with various manifestations of internal conflict or instability.[31] Data sets consequently consist of

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[31]See Orlansky (1970: 25-40) for a review of research on domestic conflict and factor analytic searches for dimensions of the phenomena. Specific research includes Rummel (1963, 1966),

such discrete event items as riots, general strikes, coups, and assassinations. When viewed from the perspective of the universe of "stresses" to which a society is potentially vulnerable, it immediately becomes clear that this conceptualization excludes too many factors from the "equation."

As the preceding section suggests (see especially Table 3-3, p. 66), internal turmoil and unrest can be clustered into two broad realms: governmental instability and societal unrest. The first dimension subsumes instability events which are confined to the formal political system while the second consists of behaviors which involve the mass public. This bifurcation implies that there may be a fundamental difference between intra-systemic (i.e., actions involving the political elite and perhaps a counter-elite) and extra-systemic violence and unrest.[32] One salient classificatory dimension for intrastate crises may therefore be the range of subnational actors involved (or the extent to which the mass public -- or segments of it -- is mobilized).

Tanter (1966), Feierabend and Feierabend (1966), Banks (1972), Nesvold (1971), and Gurr (1967, 1968a, 1968b, 1970); on Latin America, see Bwy (1968); Gurr and Bishop (1976) present a typology of indicators in internal and transnational violence. The concept of internal war and the etiology issue are discussed in Eckstein (1965). On the major theories and research results in the area of domestic conflict/internal war, see Feierabend et al. (1972) and Hibbs (1973). The more generic concept of aggressive participation is discussed in Hibbs (1973) and Muller (1977: 71-86).

[32]Hibbs (1973: 7-8) distinguishes sharply between mass and elite factors. His factor analysis of politically significant, collective, antisystem behaviors yields two dimensions; the "anomic violence" or "turmoil" factor he labels Collective Protest while the "internal war" or "revolutionary" dimension is referred to as Internal War. Subsequently, elite repression and coups are introduced into the analysis as other variable areas; our conceptualization merges coups with other indicators of governmental instability.

In addition to the range of actors and groups and such other potential criteria as the time span and the range of issues (e.g., issue-specific versus "diffuse" crises), the type of issue per se emerges as a key criterion. Researchers in domestic political analysis (e.g., Dahl, 1961; Lowi, 1967) and foreign policy analysis (e.g., Rosenau, 1966; Zimmerman, 1973) have exhibited some awareness of the impact of issue area. Economic crises (e.g., recessions and depressions) and political crises (e.g., constitutional crises, the appearance of fissures within ruling coalitions, protest resignations of key cabinet members, etc.) may pose different problems and suggest varying implications. Electoral crises -- such as critical elections which signal impending party realignment -- should also be considered.

Other types of intrastate crises could be delineated (such as technological-environmental crises), but the primary concern here is to emphasize the importance of typing internal crises on the basis of issue content. This vital research task has been neglected in the past. If political science lacks a rich typology of situations, as George et al. (1971: xiii) note, this criticism is applicable with special force to foreign and domestic crisis analysis.

In fact, the degree of conceptual specification and empirical progress within prominent "cells" of the "typology" is disappointingly modest. While Morse (1972) argues convincingly that analysts should allocate more attention to the phenomenon of international economic crises and Parker (1977b) reviews the research on employing economic indicators for monitoring international affairs and forecasting crises, the cross-national analysis of domestic economic crises is both sparse and unsystematic.

As noted, we maintain that the events data approach which has been employed for monitoring interstate crises and

other foreign policy behavioral sequences is both inadequate and simplistic when it is applied to intrastate crisis behavior. It will be necessary to develop more complex observational techniques in order to chart and analyze the domain of intrastate crisis activity.

Aside from the various data sets which measure domestic conflict, there are very few cross-national, empirical domestic crisis data sets. McClelland's D-files approach should be mentioned (see McClelland, 1978a, 1978b, McClelland et al., 1976). Although D-files do not profile "crises" directly, the data are designed to monitor and forecast stress and tension. McClelland advances this rationale for the use of prestige newspapers as sources for D-files data:

> News organizations are charged constantly with reveling in the obscenities of violence and in the base emotions aroused by conflict. Seen from a slightly different angle, violent and conflictual situations represent threats to community and the news organizations provide a warning service to give notice of approaching hazards and dangers [1978b: 6].

McClelland (1978b: 6-7) continues by listing 30 illustrative "hazards and dangers," ranging from coups and earthquakes to terrorist hijackings and ecological upsets and tragedies.

According to McClelland (1978b: 13), D-files were the outgrowth of a process of searching for data that would operationalize the concept of threat recognition. Employing the New York Times and The Times of London, the D-file coding procedure involves daily monitoring of the newspapers in order to extract "D"-related reports (i.e., accounts of dangers, disasters, disturbances, etc.). The basic data consist of short descriptions from news stories of direct warnings of danger or of "stimulus information" referring to dangerous situations.

Estimators then judge the situations in the D-file in terms of four aspects of threat (see McClelland et al., 1976: 14-17 and McClelland, 1978b: 14-15). For each item, the estimator supplies four numbers, thus converting verbal material into quantitative data. The first scale is a nine point rating of the relative degree or severity of threat. The second evaluates the threat direction ("tilt"), which provides an appraisal of whether or not the situation is worsening. "Speed" is measured by the third scale. The fourth scale provides a judgment of whether the situation is being contained or is spreading (i.e., involving more parties and/or shifting from a local to a national or from a national to an international dimension).

The domestic events data approach has been employed in a context which includes all major types of internal event/interactions (see Slater, 1976, 1977; Slater and Orloski, 1978). Central to the data collection operation of the Governmental Change Indicators Project is the proposition that it is possible to amass domestic events data sets which are isomorphic to such interstate events data sets as WEIS.

According to the Governmental Change Indicators Project coding scheme, a domestic event is a single and discrete action that has an identifiable initiator (actor) and recipient (target) and can be described by a type of behavior which links the actor with the target. Events are coded in terms of nature (domestic, foreign, domestic repressive), date, and origination (region). Subnational actors and targets are also identified; the list for Peru includes the general categories of government, political parties, the Church, professional organizations, the armed forces, and the press and other media. The behavior type coding scheme is a modification of the conventional WEIS category system. Each event is also coded in terms of substantive issue area and source.

Slater (1978) discusses results for Peru, the one case which has been analyzed in detail (see Slater and Orloski [1978] for preliminary results on Chile). The temporal span in the Peruvian analysis is the 1974-1977 period. The Foreign Broadcast Information Service (FBIS) data set includes 1175 discrete events for the period between September of 1974 and June of 1977. Conflict and cooperation totals are similar and the two coexisted in most months. The data reveal three time phases: the pre-coup period (September, 1974 - August, 1975); the "lull" or transition period (September, 1975 - April, 1976); and the post-coup period (May, 1976 - May, 1977).

An issue-based analysis reveals several interesting trends (Slater, 1978: 40-41). During the pre-coup period, the salient issues are stability, the revolution, labor, and media. In the post-coup phase, there is a slight shift toward the economy; overall, behavior has become more cooperative. However, cooperation and conflict continue to coexist and there is a higher volume of behavior in the post-coup era rather than a marked change in the nature of behavior.

This brief overview of the D-files and domestic events data approaches exhausts the available cross-national (or potentially cross-national) data collection procedures. While it should be noted that advantages and disadvantages can be associated with each of the two orientations, these factors will not be discussed here. What is noteworthy is that there is such a marked paucity of conceptual and empirical research in the realm of intrastate crises analysis. Furthermore, both the D-file and events orientations are expensive and laborious -- especially if the goal is the generation of data for almost 80 states.

3.4 The Internal Situation Profile

The D-files approach completely ignores the substantive issue area consideration while the events strategy attempts to "force" domestic political patterns and processes into an actor-event-target "straitjacket." In the decentralized and even anarchic world of international politics, independent entities act, react, and interact; this also occurs within political systems, but there are also many instances when common problems arise. Thus, the events framework does not always apply in a domestic context. In an effort to develop an indicator system which incorporates issue area assessments and does not impose an IR event-based scheme on the milieu of domestic situational analysis, we generated a prototype data set which we refer to as the Internal Situation Profile or ISP.

3.4.1 Conceptual Overview. What are the specific phenomena which tap the concept of "potential domestic stress?" This question constituted the basis for our efforts to develop a set of internal indicators which would function collectively as a system-level "thermometer." Our initial concern was twofold: we wanted to gauge the potential for crisis as well as the presence of crisis within a polity. We were consequently interested in two distinct types of variables: pre-crisis predictors and indicators of crisis.

Given the lack of prior theoretical work in the study of intrastate crisis, we were unable to generate theoretically-derived indicators. The list of indicators is therefore ad hoc in nature. However, we were guided by the basic question: "what are the primary internal problems which a society faces?" This led to the decision to develop discrete indicators in five major problem areas: economic; social; military; governmental; and political.

The indicators are listed in Table 3-4. This preliminary list is the result of CNCI staff discussions and perusals of such existing data sets as the Governmental Change Indicators data base, the dangers-file data, and the various collections of domestic conflict and instability data. The list of indicators currently features 67 discrete items. Included are 15 economic, 12 societal, 7 military, 12 governmental, and 21 political items. Some of the measures reflect domestic events or occurrences; others tap aspects or dimensions of situational contexts. Thus, isolable events such as strikes, executive changes, and assassinations are included. Additionally, reported judgments concerning trends and states of affairs are also noted. For example, if the source reports a change in the inflation rate or in the ecology sphere, the data are recorded.[33]

The data base is designed to provide a comprehensive "mapping" of a society's agenda of problems. Ultimately, analysts could generate system-level aggregate profiles in specific issue arenas. For example, what is the "burden" on country X as opposed to the comparable "load" on Y? In country X, how much "stress" is evident in the economic domain as opposed to the political? Do economic crises precede political or governmental crises?

Included in the ISP data set are internal problem measures (potential crisis indicators), genuine pre-crisis indicators, and indicators of internal crises. The ISP is thus designed to monitor simultaneously three temporally and substantively distinct (and disparate) situations and events:

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[33]The indicators which reflect rates or trends are "states of affairs" characterizations, not periodically reported measures of a phenomenon such as over-time unemployment or inflation data. In contrast, other CNCI data sets consist of periodically reported trend data (such as annual data on GNP or unemployment). The ISP rate and trend reports are based on the assumption that news chronologies reflect unusually salient state of affairs items. Thus, a recorded reference to the cost of living increasing or decreasing or to crime experiencing an increase or decrease is interpreted to mean that the particular problem is prominent on that political system's issue agenda.

Table 3-4

INDICATORS: INTERNAL SITUATION PROFILE

Revised List of Indicators

Codes
0 = no change; comment or neutral description of an ongoing situation
1 = increase; event occurs or begins
2 = decrease; event ends or is terminated

Categories and Examples

I. ECONOMIC INDICATORS

1. Cost of Living
   (1) Increase (prices up; also reflected by reports of standard of living down, wages down)
   (2) Decrease (prices down; also reflected by reports of standard of living up, wages up)
   (0) Stable - prices, wages, etc.

2. Growth in National Production
   (1) Increase (in food crop, automobile production, GNP, etc.)
   (2) Decrease or decline (including reports of industry shutdowns)
   (0) Report on GNP, with no significant change noted

3. Unemployment
   (1) Increase (more unemployment; layoffs)
   (2) Decrease (less unemployment or more people hired)
   (0) Neutral report

4. Inflation (consumer or wholesale price index)
   (1) Increase (inflation rate increasing)
   (2) Decrease (inflation rate decreasing or "improving")
   (0) Neutral report

5. Balance of Payments
   (1) "Increase" (improvement - export income increasing, import spending decreasing)
   (2) "Decrease" (worsens - export income decreasing, imports increasing)
   (0) Neutral report

6. Interest Rates
   (1) Increase
   (2) Decrease
   (0) Neutral Report

Table 3-4 (Cont'd.)

7. Currency Exchange Rate
   (1) "Increase" (becomes more favorable)
   (2) "Decrease" (becomes less favorable)
   (0) Neutral report

8. International Credit
   (1) Increase (additional credit received or credit rating up)
   (2) Decrease (credit rating down; credit denied; difficult to obtain credit)
   (0) Neutral report

9. Investment
   (1) Increase (in construction, etc.)
   (2) Decrease (in construction, etc.)
   (0) Neutral report

10. Food Prices
   (1) Increase
   (2) Decrease
   (0) Neutral report

11. Resources
   (1) Increase (or surplus of some good or type of worker)
   (2) Decrease (resource shortage - raw materials, goods, type of labor, etc.)
   (0) Neutral report

12. Recession or Depression
   (1) Increase in economic adversity (general report)
   (2) Decrease (improvement) in economic adversity (general report)
   (0) Neutral report

13. Economic Pact
   (1) Signed or ratified
   (2) Rejected or nullified

14. Government Intervention in Economic Sectors
   (1) Increase (imposition of price controls or supports; subsidies granted)
   (2) Decrease (any of the above terminated)

15. Strike (Labor-Management Conflict)
   (1) Occurs (or is reported to be imminent)
   (2) Ends (is settled or averted)
   (0) Neutral report; comment on ongoing strike

II. SOCIAL (COLLECTIVE) INDICATORS

20. Medical Health
   (1) Increase (in hospitals, doctors, or medicines; improved care or delivery)
   (2) Decrease (epidemics; disease problem reported; medical supply or hospital shortage)

21. Housing
   (1) Increase (in availability; more "affordable")
   (2) Decrease (in availability; less "affordable")

Table 3-4 (Cont'd.)

22. Education
    (1) Increase (in expenditures, schools, students, or teachers)
    (2) Decrease (in expenditures, schools, students, or teachers)

23. Welfare
    (1) Increase (in welfare or social security expenditures)
    (2) Decrease (in welfare or social security expenditures)

24. Transportation
    (1) Increase (in highways, mass transit, expenditures)
    (2) Decrease (in highways, mass transit, expenditures)

25. Crime
    (1) Increase
    (2) Decrease

26. Nutrition
    (1) Increase (in food distribution, food assistance to the poor)
    (2) Decrease (increase in starvation, famine occurs, etc.)

27. Natural Disaster
    (1) Occurs (flood, earthquake, etc.)

28. Population Change
    (1) Increase (in population, birth rate, immigration; decline in death rate)
    (2) Decrease (in population, birth rate, immigration; increase in death rate)

29. Ecological Problem (other than 26, 27, or 28; e.g., pollution, chemicals, waste materials)
    (1) Increase in the problem
    (2) Decrease in the problem

30. Boycott
    (1) Begins
    (2) Ends or subsides

31. Riot
    (1) Begins
    (2) Ends or subsides

III. MILITARY INDICATORS

40. Arms or Weapons Procurement from Abroad
    (1) Obtains arms from foreign source, is offered arms or military aid
    (2) Fails to obtain arms from foreign source

41. Military manpower
    (1) Increase in people in armed forces or in training quality
    (2) Decrease in people or in training quality

Table 3-4 (Cont'd.)

42. Arms Budget
    (1) Increase in military spending
    (2) Decrease in military spending

43. Arms or Weapons Procurement from Domestic Sources
    (1) Increased production of weapons system, new system adopted
    (2) Decreased production, weapon system rejected

44. Defense Pact
    (1) Agreement enhancing defensive position
    (2) Rejects, refuses, or nullifies defense pact

45. Arms Control
    (1) Adopts arms limitation (bi- or multi-lateral)
    (2) Rejects, nullifies, refuses arms limitation

46. Bases and Installations; Deployment (redeployment of weapons)
    (1) Adds new base or installation (domestic or foreign)
    (2) Abandons or closes existing base or installation

IV. GOVERNMENTAL INDICATORS

50. Illegal Executive Change: Revolution (mass-based)

51. Illegal Executive Change: Coup (elite-based)

52. Legal Executive Change: Unscheduled (death, early election)

53. Legal Executive Change: Scheduled (election, end of term)

54. Impending/Threatened Change (important executive position)

55. Change in Important Executive Position (cabinet, etc.)

56. Administrative Structure Change
    (1) New agency or unit, change in duties
    (2) Abolition of ministry or committee

57. Constitutional Change

58. Legal Change (Election or Appointment): Legislature or Supreme Judicial Body

59. Improper Dismissal: Legislature or Supreme Judicial Body

60. Expulsion (refusal to seat member of legislature or supreme judicial body)

61. Improper Interference or Dismissal of Regional/Local Political Body or Officials

Table 3-4 (Cont'd.)

V. POLITICAL INDICATORS

70. Nationalization of Domestically Owned Firm(s)
    (1) Firm nationalized or threatened
    (2) Firm de-nationalized or returned to domestic owners; compensation provided

71. Nationalization of Foreign Owned Firm(s)
    (1) Nationalized or threatened
    (2) De-nationalized or returned to foreign owners; compensation provided

72. Arrests (political)
    (1) Arrests made; convictions
    (2) Political prisoners freed or sentence reduced

73. Exile or Deportation
    (1) Person(s) exiled or deported
    (2) Exiles return; repatriation

74. Execution (political)
    (1) Occurs

75. Mass Purge
    (1) Occurs

76. Harassment of Political Organization (or Individual)
    (1) Begins or increases
    (2) Ends or decreases

77. Political Organization Banned or Dissolved
    (1) Ban imposed
    (2) Ban lifted

78. Martial Law or Declaration of Emergency
    (1) Imposed
    (2) Ended

79. Charge of Electoral Irregularities

80. Restriction of Press Freedom
    (1) Announcement of restrictions; publication banned
    (2) Termination of restrictions; more leniency or less censorship

81. Assassination

82. Terrorism/Sabotage (kidnapping, hijacking, etc.)
    (1) Increase
    (2) Decrease (stopped or prevented)

83. General Strike (political)
    (1) Begins or spreads
    (2) Ends

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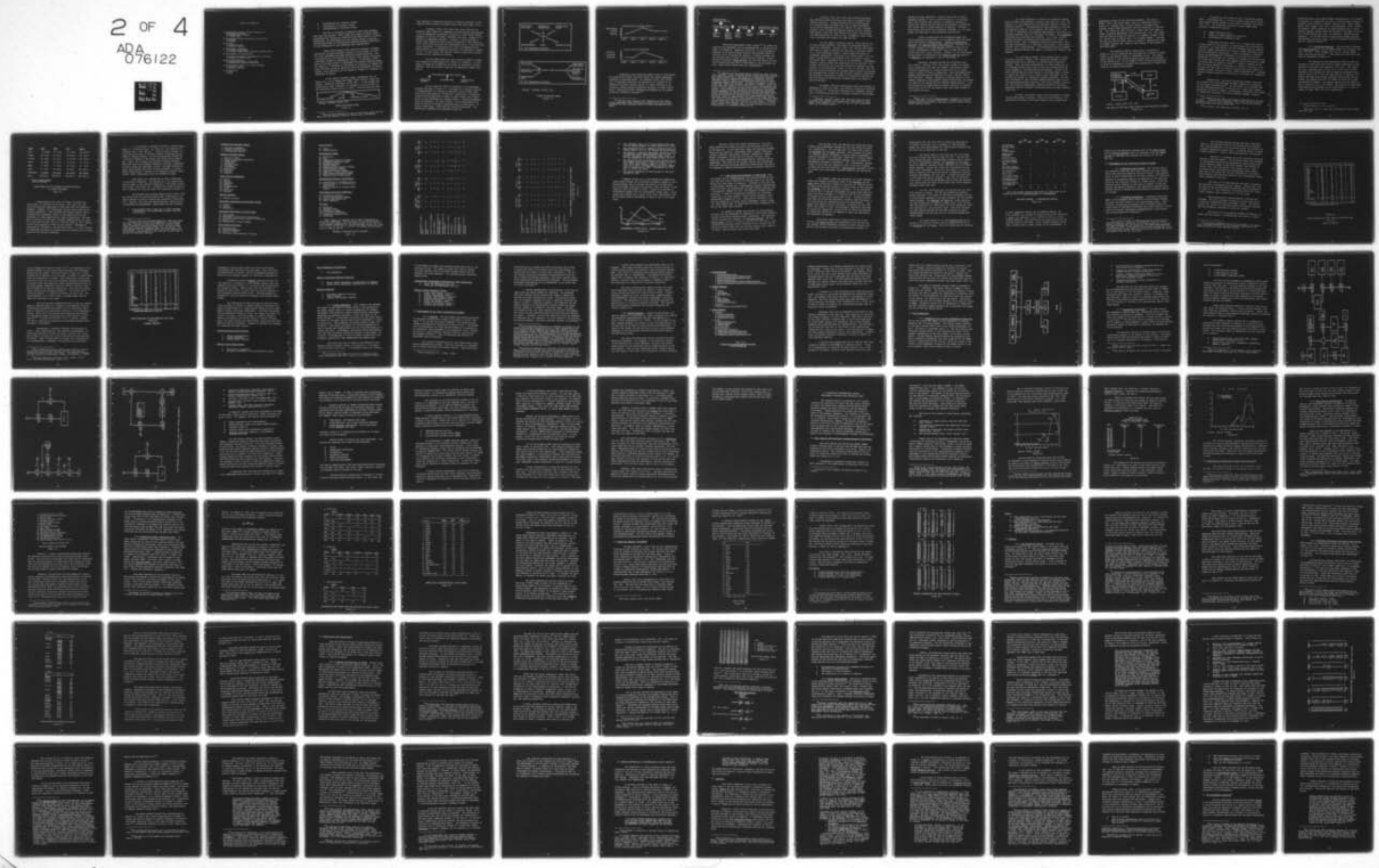


Table 3-4 (Cont'd.)

84. Demonstrations, Protests, and Other Organized Civil Disobedience (non-violent)
    (1) Increase; begins or spreads
    (2) Decrease; ends

85. Sustained Mass Violence (insurrection, civil war, etc.)
    (1) Increase
    (2) Decrease

86. Defection
    (1) Increase or occurs
    (2) Refused or prevented

87. Group Demands: Integration
    (1) Increase (centralization)
    (2) Decrease (autonomy demands, separatism, decentralization)

88. Group Demands: Policy Distribution

    (1) Increase in influence or representation (for own group)
    (2) Decrease (for another group)

89. Party Fractionalization
    (1) Increase (party splits; alliance ends)
    (2) Decrease (party mergers; alliance forms)

90. Political Pact or Treaty (e.g., prisoner exchanges)
    (1) Signed or ratified
    (2) Rejected or nullified

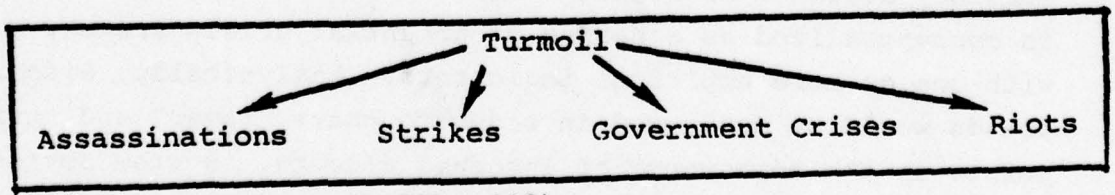
91. Political Party
    (1) Forms
    (2) Ends

- Preconditions for internal crises;
- Precipitants of internal crises;
- Manifestations of internal crises.

The ISP is currently in embryonic form; many problems must still be resolved. Among these are issues of common versus system-specific indicators, predictive and other forms of validity, feasibility, the development of more refined coding categories, and the possibility of incorporating expert-generated evaluations of such dimensions as item intensity and "significance."

Three issues warrant more detailed treatment, although the paucity of prior systematic inquiry on the subject of internal crisis phenomena precludes definitive generalizations. One issue pertains to the question of causal versus effect indicators, a prominent concern in measurement theory. As Jacobson (1973b) points out in his review of measurement strategies regarding domestic conflict,[34] variables in this area are generally so vaguely defined that they cannot be specified with any confidence. He notes, however, that indicators can be viewed as "causes" or "effects" of unmeasured variables.

In the effect indicators model (reproduced here as Figure 3-1), it is assumed that some latent trait(s) causes the "effect" indicators (Jacobson, 1973b: 442). In the example depicted below, each "indicator" is assumed to be the product of the underlying turmoil factor or trait. This has been the domi-



Source: Jacobson (1973b: 443).

EFFECT INDICATORS MODEL

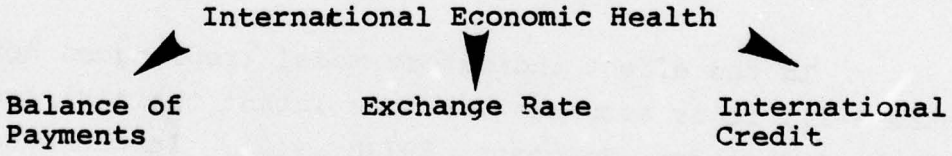
Figure 3-1

[34]The concrete examples for each of the three issues are all taken from the domestic conflict (events data) literature.

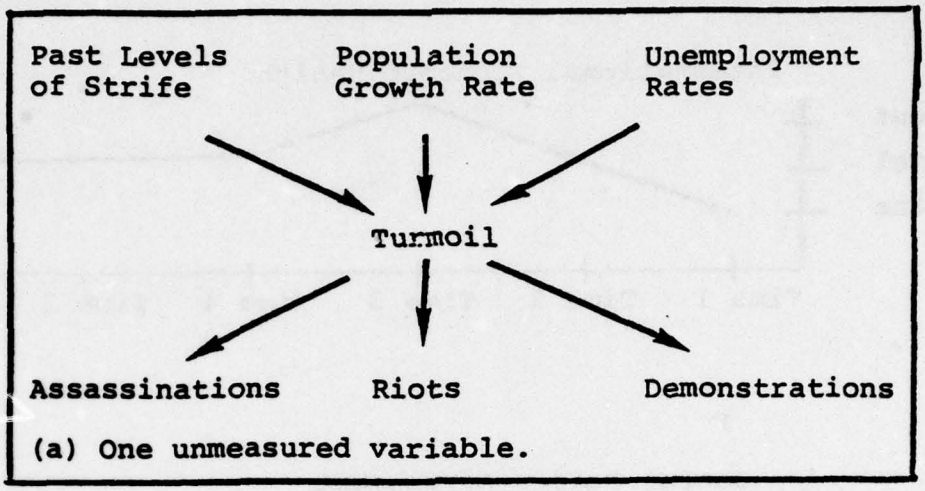
nant approach in empirical research on internal violence, as the numerous factor analytic studies clearly show (see Hibbs, 1973).

Jacobson (1973b: 444) notes that since conflict has generally been viewed as a dependent variable and has been posited to be an unmeasured intervening variable to a much lesser extent, examples of the use of causal indicators are rare. Figure 3-2(a) depicts an unmeasured variable -- turmoil -- which provides a direct link between the three causal indicators -- past levels of civil strife and population and unemployment rates -- and the three effect indicators -- assassinations, riots, and demonstrations. The extension to two unobserved variables is illustrated in Figure 3-2(b). In both cases, the conflict factor is explicitly conceptualized as an intervening variable.

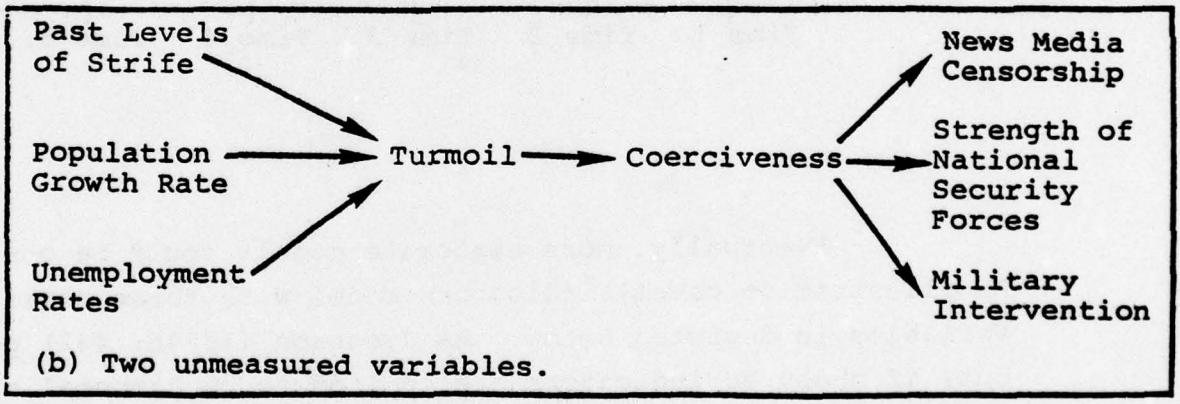
The following section of this chapter presents a conceptual scheme for constructing ISP "scales" or "indices." If each index is viewed as a dimension that would be uncovered by factor analysis, then the discrete items can be regarded as effect indicators:



In this approach, which is analogous to the meaurement strategy depicted in Figure 3-1, the domain of intrastate affairs is conceptualized as a series of potential crisis arenas, each with one or more empirical indicators. Analytically, diachronic trends would be monitored in order to chart "fever" and "crisis" points on the topography of internal affairs. System performance could be assessed -- at least crudely -- by tracking deviations above and below the normal or baseline point in each arena. In certain issue areas, trend profiles could be delineated. Two hypothetical examples are presented on page 84.



(a) One unmeasured variable.

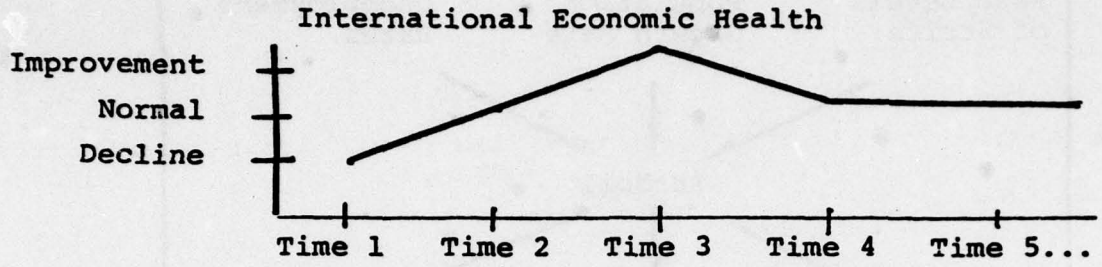


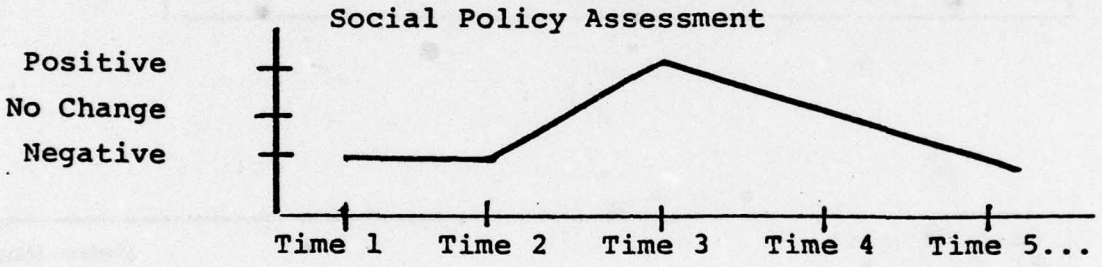
(b) Two unmeasured variables.

Source: Jacobson (1973b: 445).

CAUSAL INDICATORS MODEL

Figure 3-2





Eventually, more elaborate models could be constructed. An illustrative causal indicators model with three unmeasured variables is depicted below. As Jacobson (1973b: 442) points out, if measured indicators are posited to be "causes" of an underlying variable and the latter is linked (directly or indirectly, through another unobserved variable) to other indicator(s), then multivariate regression procedures will be appropriate for estimation purposes.[35]

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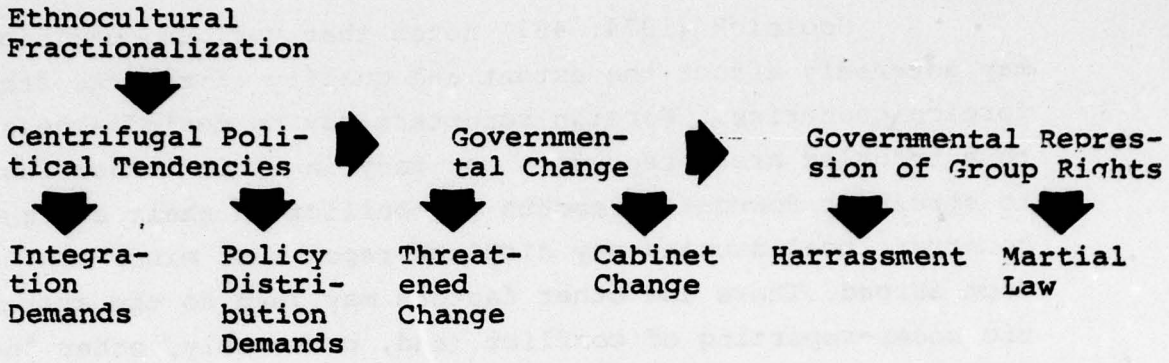
[35]A Partial Least Squares (PLS) approach is also potentially applicable; each underlying variable would be a latent variable and the indicators would be treated as manifest variables.



Aside from measurement theory issues,[36] two other concerns must be addressed. One is methodological in nature and the other is conceptual. Regarding the former, in his critique of research on the nexus between internal and external conflict, Scolnick (1974) discusses the question of source coverage and the related issue of single versus multiple sources. Since a periodic chronology (Facts on File) was the sole source for the ISP prototype data set which is discussed in the following section, these points warrant explicit consideration.

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[36] In addition to the causal/effect indicators model distinction, Jacobson (1973b) discusses several other pertinent measurement model assumptions in the study of intrasocietal conflict. One concerns uni- versus multidimensional variables; some researchers adopt an implicit unidimensional model with multiple indicators whereas others posit (or implicitly employ) a multidimensional model with multiple indicators; Jacobson (1973b) concludes that the latter is more valid and this interpretation applies even more obviously to the larger domain of intra-societal crises. Also germane is the single versus multiple indicators option; Jacobson (1973b) catalogues the statistical advantages and disadvantages of adding indicators and the traditional theoretical justification for using multiple indicators. Given the primitive status of the ISP data set, other measurement design decisions (such as random versus correlated error terms and additive versus multiplicative relationships) should be deferred until the prototype data have been analyzed in more detail. Jacobson (1973b) does note, however, that all existing measures of intrastate conflict have assumed additive relationships; this may be generalizable to intrastate crises per se.

Scolnick (1974: 487) notes that various conditions may adversely affect the extent and quality of reports from foreign countries. Foreign reporters may be denied access to a troubled area; reporters may vary in their tendencies to stress or downgrade reports of conflict in their assigned country; local stories may displace reports of minor conflict from abroad. These and other factors may lead to the systematic under-reporting of conflict (and, presumably, other "negative" conditions and events) for some nations.

For the study of internal conflict (and internal crisis more broadly defined), the impact of censorship should be explicitly considerd. Scolnick (1974: 488) reports that censorship does not seem to deflate the reporting of conflict events (i.e., high consorship scores -- which assess the extent of government censorship of the press on an annual basis -- do not show a strong positive correlation with low conflict scores, indicating that a systematic bias is not operating). Undoubtedly, unusually salient events and conditions will be reported. But regimes which censor the press may effectively suppress the publication of non-spectacular items; if this is the case, then ISP profiles would be accurate for systems without press restrictions and systematically biased for the ones with extensive censorship. The inclusion of censorship scores in correlational analyses of ISP data would provide empirical evidence about the effect of press censorship.

Presumably, periodic chronologies avoid the tendency of newspapers to vary over time in the detail of reporting (Scolnick, 1974: 488-489).[37] Events data extracted from newspaper sources tend to overemphasize periods of intensive conflict (and perhaps

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[37]However, Scolnick (1974: 488) does note that one study concludes that periodic chronolgies are "less uneven in this regard than newpapers, but...not 'as free of this troublesome defect as one might expect.'"

intensive crises generally?) and are also prone to underemphasize periods of low or routine activity. If this does hold, then findings that conflict is marked by periods of intense and minimal activity may be attributable to distorted data rather than to actual patterns of behavior. Periodic chronologies may avoid this distortion syndrome -- or at least dampen the amplitude of the misleading oscillations.

Little is known about the differences among the various periodic chronologies. In his comments about the three major chronologies (Facts on File, Keesing's Contemporary Archives, and Deadline Data on World Affairs), Scolnick (1974: 490-491) suggests that Facts on File should be used only as a minor supplementary source until more is known about the distortions that it may introduce. However, in our preliminary coding effort, we discovered that Facts on File was superior to Keesing's and therefore relied on the former.[38]

Generally, multiple sources are preferred over a sole source. Scolnick (1974: 492) cites a number of studies which unanimously show that the commonly used sources report different frequencies of conflict events and do not report types of events in similar proportions. Both shortcomings presumably characterize the reporting of purely internal events and conditions. However, reliance on multiple sources is extremely expensive, poses complex coding difficulties, and raises the issue of the equivalency of concepts across sources. A single source may be biased against certain countries or regions; future work on the ISP and similar data sets might attempt to use regional sources.

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[38] From 1950 to 1970, Facts on File increased in size from 428 to 988 pages (Scolnick, 1974: 490). Perhaps more recent volumes have more accurately reported the total amount of news which actually occurs.

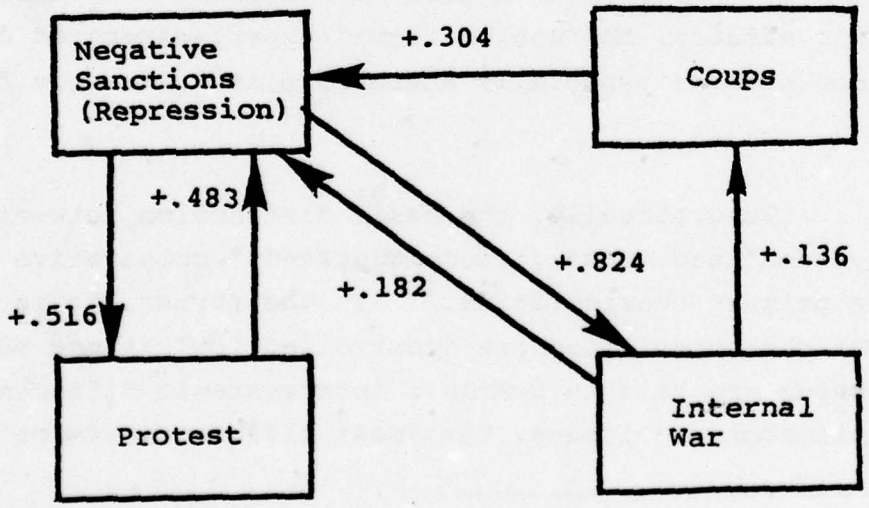
The latter suggestion alludes to a conceptual problem which pervades cross-national research: what Scolnick (1974: 493) refers to as "the comparability of nominally identical events in different nations." This equivalence issue surfaces in any form of comparative inquiry (see Przeworski and Teune, 1970). The ISP list of indicators is ostensibly applicable to any polity and therefore presumes that the indicators are common. But contextual variations may invalidate this premise. Is a "coup" in Latin America equivalent in meaning and significance to a "coup" in Western Europe? Does "governmental economic intervention" have the same connotations in a developed, open system, a Third World country, and a closed system? Do centrifugal political demands have an identical meaning and impact in Switzerland, Nigeria, and Denmark?

In a critique of Hibbs' (1973) general model of mass political violence, Sanders (1978) questions whether a single generalization can be applied to a diverse set of political systems. Thus, variable relationships in causal models may be as divergent across system types as are the concepts which are often assumed to be equivalent across systems. Sanders estimates coefficients for each country in the Hibbs study in order to assess the utility of the latter's final path model in predicting the pattern of interaction between variables. The general conclusion is that universal generalizations about the interrelationships between sanctions, collective protest, internal war, and coups are misleading; different groups of countries apparently exhibit different interrelationship patterns (Sanders, 1978: 121).

At best, the general model can only describe "average" relationships among variables. Aside from Latin America, the substantive findings in the Hibbs research are not especially

applicable to most of the countries examined. The core of Hibbs' (1973: 184) final model, which is reproduced below as Figure 3-3, assumes that a causal sequence originates with Protest, which evokes Repression and then escalates to Internal War. The latter may then initiate a causal loop that leads to Coups, increased Repression, more Internal War, etc. This model does not hold up across all regions; for example, Sanders (1978: 20) reports that in Africa and -- to a lesser extent -- the Middle East and the Far East, there is clearly a tendency for coups to precede internal war, which is the reverse of the pattern in the Hibbs model.

The domestic conflict model which is depicted in Figure 3-3 can be viewed as the prototype for a series of causal models in the general realm of intrastate crisis. The models would consist of the various variable areas which are featured in the ISP data set. As the Sanders (1978) critique demonstrates, it would be necessary to consider the possibility of varying patterns of variable relationships.



Source: Hibbs (1973: 181, 184).

THE CORE OF THE FINAL HIBBS MODEL OF MASS POLITICAL VIOLENCE

Figure 3-3

Conceptually, the concern is with "equivalent measurement." Measurement that is valid in terms of each social system and reliable across systems is equivalent (Przeworski and Teune, 1970: 107). The researcher confronts a choice among three options in comparative inquiry:

- Common indicators only;
- Common and system-specific indicators;
- System-specific indicators only.

Przeworski and Teune (1970: ch. 6) discuss each option in the context of the question of establishing the equivalence of indicators. As noted earlier, the ISP prototype data set exemplifies the "common indicators only" option. Common indicators alone may be insufficient; eventually, it may be necessary to develop a series of system-specific indicators (or at least to vary the weightings of indicators as a function of system-level differences). It is here that country and area experts could be utilized to judge the significance of specific items.[39] A panel of experts can be used to assign numerical evaluations to a model's variables. Given the lack of "hard" data on internal violence and other aspects of domestic affairs, the use of "soft" expert-generated data in applied research becomes especially attractive as a strategy for generating data.

Theoretically, the basic distinction between "most similar systems" and "most different systems" comparative strategies is the primary consideration.[40] In the former, it is assumed that various characteristics are "controlled for" (since many systemic attributes are held in common); intersystemic differences are viewed as explanatory variables. The "most different systems" research

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[39]An example of the use of intelligence specialists as sources of data is provided in Dahlgren (1978), which concerns the application of Gurr's (1970) theoretical model to Chile in mid-1973 and three other Third World countries.

[40]For details, see Przeworski and Teune (ch. 2).

design strategy, which seeks maximal heterogeneity in the sample of systems, is typified by the bulk of cross-national studies on internal and/or external conflict (such as Gurr, 1968a, 1968b; Hibbs, 1973; Rummel, 1963, 1966; and Wilkenfeld, 1973). However, the Sanders (1978) reanalysis of Hibbs suggests that a "most similar systems" design should be pursued in the study of internal violence specifically and, by extension, internal crises generally. As the CNCI state classification scheme analysis demonstrates, political systems can be clustered into discrete sets of "similar systems."[41]

3.4.2 Preliminary Results. ISP data were collected from Facts on File for the following states for the years 1966, 1970, and 1975: Peru, France, the U.S.S.R., Zaire, Egypt, India, and the Philippines.[42] Item totals for each state and year are presented in Table 3-5.

The tendency of this particular source to show an increase in total size over time is clearly reflected in the entries in the table (see Scolnick, 1970: 490). The totals for Peru increased from 2 (1966) to 43 (1970) to 53 (1975). Similarly, the coverage for the Philippines increased from 1 item in 1966 to 58 in 1970 and then down to 21 items in 1975. France and India both showed increases across time; for the former, the change from 1970 (34 items) to 1975 (127 items) was especially marked. The general pattern did not apply to Zaire (from 28 to 19 to 16 events); the entries for the United Arab Republic were minimal in all three years (5, 9, and 13 events in 1966, 1970, and 1975, repectively).

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[41] See section 3.6 (pp. 110-115).

[42] For the U.S.S.R., data were collected for 1976 rather than for 1975.

State	1966	1970	1975	Totals
Peru	2 (0.3%)	43 (5.4)	53 (6.6)	98 (12.2)
France	18 (2.2)	34 (4.2)	127 (15.9)	179 (22.4)
U.S.S.R.	23 (2.9)	59 (7.4)	62 (7.7)*	144 (18.0)
Zaire	28 (3.5)	19 (2.4)	16 (2.0)	63 (7.9)
Egypt	5 (0.6)	9 (1.1)	13 (1.6)	27 (3.4)
India	53 (6.6)	64 (8.0)	92 (11.5)	209 (26.1)
Philippines	1 (0.1)	58 (7.2)	21 (2.6)	80 (10.0)
Total	130 (16.2)	286 (35.7)	322 (40.2)	800 (100.0)

[a]Source: Facts on File.
*1976 for U.S.S.R.

ITEM TOTALS FOR THE INTERNAL SITUATION PROFILE BY STATE AND YEAR[a]

Table 3-5

Aside from the low total for Egypt (27 events for three years, 3.4 percent of the total), the totals for each state are generally comprised of sufficient data for analytical purposes. However, the inconsistent totals across time are obviously problematic. Such patterns may reflect general source unreliability, systematic under- or overreporting for given countries, or under-reporting for 1966; alternatively, the data may be accurate in some cases, possibly demonstrating, for example, that Peru was very calm in a relative sense in 1966, whereas a major coup occurred in 1968 and the system's "thermometer" registered an increased in the following years. At least crudely, the aggregate patterns may provide accurate barometers of internal trends in the countries examined.

It is extremely cumbersome to refer to results which apply to 67 discrete items. In Table 3-6, the items are rearranged into 11 ISP indices.[43] These a priori "scales" include two which refer to economic factors (international and domestic economic health), one which synthesizes codings for a variety of domestic issue areas (the social policy assessment index), and a single item natural disasters category. There are also two government repression clusters (repression of group rights and individual rights), two mass activism domains (anti-regime activities and mass protests), a governmental change scale, a measure of governmental economic intervention, and a centrifugal political tendencies index.

Each index is a weighted sum of event frequencies in particular categories. The weights are 1 for events which were so coded in the original scheme and -1 for events originally coded 2 (see Table 3-4). Weighted ISP scores for each of the 11 indices (by state and year) are displayed in Table 3-7.

The frequent zero entries suggest quite clearly that any future work with ISP data should rely on multiple or regional sources in order to ensure the inclusion of sufficient data. However, even with one news chronology, certain striking patterns are discernible. Among these are the following:

- The increase from 0 (1966) to 11 (1970) and then a decrease to 1 for government economic intervention in Peru;

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[43] Twelve items are excluded completely; these are items for which there are either no references or, at a maximum, less than 2 percent of the total item pool includes these items: recession; population change; all 7 of the military indicators; electoral irregularities; and defections. The other deleted item is economic pacts, which is excluded for two reasons: the ambiguity of the item and the fact that it refers to interstate relations.

International Economic Health

5. Balance of Payments
7. Currency Exchange Rate
8. International Credit

Domestic Economic Health

1. Cost of Living*
2. Growth in National Production
3. Unemployment*
4. Inflation*
6. Interest Rates
9. Investment
10. Food Prices*
11. Resources
15. Strikes*
30. Boycotts*

Social Policy Assessment

20. Health
21. Housing
22. Education
23. Welfare
24. Transportation
25. Crime*
26. Nuitrition
29. Ecology*

Natural Disaster

27. Natural Disaster

Government Repression of Individual Rights

72. Arrests
73. Exiles
74. Executions

Government Repression of Group Rights

75. Mass Purges
76. Harassment of Political Organization
77. Political Organization Banned or Dissolved
78. Martial Law
80. Restriction of Press Freedom

Anti-Regime Activities

81. Assassinations
82. Terrorism/Sabotage
83. General Strikes
85. Civil War (Sustained Mass Violence)

Mass Protests

31. Riots
84. Demonstrations

Governmental Change

50. Revolution
51. Coup
52. Unscheduled Executive Change
53. Scheduled Executive Change
54. Threatened Change
55. Cabinet Change
56. Administrative Structure Change
57. Constitutional Change
58. Legislative/Court Change
59. Dismissal of Legislature/Court
60. Expel Court/Legislative Member
61. Regional/Local Interference

Governmental Economic Intervention

14. Intervention in Economic Sectors
70. Nationalization of Domestically-Owned Firms
71. Nationalization of Foreign-Owned Firms

Centrifugal Political Tendencies

87. Integration Demands*
88. Policy Distribution Demands
89. Party Fractionalization
91. Party Formation

Not Used

12. Recession
13. Economic Pacts
28. Population Change
40-46. Military Indicators
79. Electoral Irregularities
86. Defections

[a]Each index is a weighted sum of event frequencies in particular categories. Weights equal one for events coded "1" in the original scheme and -1 for events coded "2" in the original scheme; exceptions (*) include reversed weights for items 1, 3, 4, 10, 15, 30, 25, 29, and 87; the weight always equals one for items 56 and 88.

INTERNAL SITUATION PROFILE INDICES[a]

Table 3-6

	Egypt (UAR)			France			India			Peru		
	1966	1970	1975	1966	1970	1975	1966	1970	1975	1966	1970	1975
International Economic Health	0	-1	0	1	1	4	0	1	0	0	1	0
Domestic Economic Health	0	0	-1	1	0	-15	0	1	-1	0	0	-1
Social Policy Assessment	0	0	0	2	0	2	-1	0	1	0	0	0
Natural Disaster	0	0	0	0	7	2	1	2	2	2	4	0
Government Repression of Individual Rights	0	0	2	-3	3	3	6	5	11	0	3	4
Government Repression of Group Rights	0	0	1	0	0	1	5	2	14	0	2	6
Anti-Regime Activities	0	0	0	0	6	11	4	3	6	0	0	3
Mass Protest	0	0	2	0	5	18	8	5	8	0	2	2
Governmental Change	2	7	5	1	1	2	7	20	18	0	1	11
Governmental Economic Intervention	1	0	0	2	0	9	0	0	1	0	11	1
Centrifugal Political Tendencies	0	0	0	0	1	3	4	5	2	0	0	0

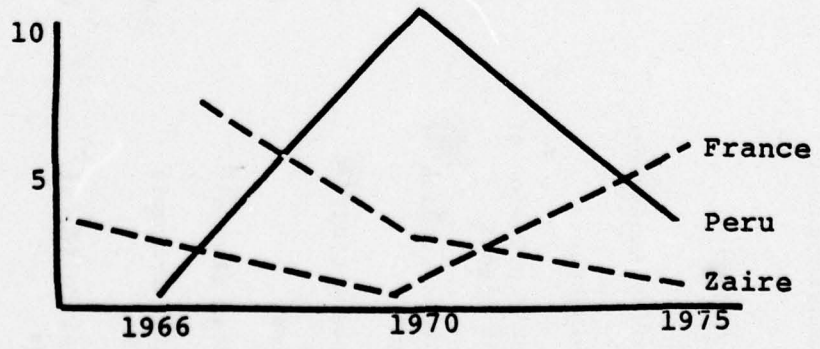
	Philippines			U.S.S.R.			Zaire		
	1966	1970	1975	1966	1970	1975	1966	1970	1975
International Economic Health	0	1	0	1	2	3	0	1	-2
Domestic Economic Health	0	-2	0	0	0	-1	0	0	0
Social Policy Assessment	0	1	0	0	0	0	0	0	0
Natural Disaster	0	6	3	1	1	3	1	0	0
Government Repression of Individual Rights	0	5	0	3	7	1	3	1	1
Government Repression of Group Rights	0	3	1	5	4	2	1	1	1
Anti-Regime Activities	0	6	1	0	0	0	-1	0	0
Mass Protest	0	15	2	0	2	1	0	0	0
Governmental Change	0	2	2	5	5	3	12	7	2
Governmental Economic Intervention	0	0	0	0	0	0	1	1	1
Centrifugal Political Tendencies	0	0	3	1	1	0	0	0	0

WEIGHTED INTERNAL SITUATION PROFILE INDEX SCORES
BY STATE AND YEAR

Table 3-7

- The increases from 6 to 11 (anti-regime acts) and 5 to 18 (mass protest) in France from 1970 to 1975;
- The precipitous drop in domestic economic health in France (from 1 to 0 to -15) across the three years;
- The upsurge in reported government repression items in India for both scales from the 1970 to 1975 points: repression of individual rights (from 5 to 11) and repression of group rights (from 2 to 14);
- The relatively and consistently high frequencies of anti-regime activities (4 items in 1966, 3 in 1970, 6 in 1975), mass protest items (8 in 1966, 5 in 1970, 8 in 1975), and centrifugal political tendencies (4 references in 1966, 5 references in 1970, and 2 in 1975) in India;
- The unusual frequency of mass protest in the Philippines in 1970.

Temporal trends for a given system and comparative trends among systems can be plotted to measure changes in system performance and to estimate the amount of stress which various systems experience continuously (such as India) or periodically (such as France in 1975). Figure 3-4 provides an illustrative example for the governmental change index. Given richer data sources and a longer trend line, analytically useful profiles could be delineated in each of the 11 ISP issue areas.



GOVERNMENTAL CHANGE INDEX: TRENDS OVER TIME

Figure 3-4

The ISP results are clearly preliminary; the pilot study reported here simply indicates the potential utility of an ISP data set. At the same time, there are numerous problems which must be resolved. Measurement model issues, source decisions, indicator equivalence problems, comparative research design strategies, reliability and validity criteria, and a number of other conceptual and methodological concerns must be considered. The scope of the problem implies that system-specific and regional prototypes should be experimented with prior to launching a massive cross-national data collection operation.

3.4.3 The United Arab Republic: A Case Study. From its primary source, Facts on File, the Internal Situation Profile data set lists a total of 22 discrete events for the UAR during the three years in question. Included in this list are: 2 governmental changes and 1 governmental economic interference event for 1966; one international economic health indicator and 7 governmental changes for 1977; one domestic economic health indicator, 5 cases of governmental repression of individual rights and 1 of group rights, 2 mass protest incidents, and 5 governmental changes for 1975. There are no listings at all for the categories of social policy assessment, natural disaster, anti-regime acts, or centrifugal political tendencies for any of the three years covered.

An attempt to assess the accuracy of the prototype ISP data set was undertaken by comparing it with other possible sources of Egyptian internal events indicators. Two basically similar sources were employed, the African Recorder and the Africa Diary; both are published separately in New Dehli, India and provide excellent textual coverage of all internal and external political events for all African nations over a span of 30 years. The following discoveries were made.

For the year 1966, the ISP data set lists only three events (two governmental changes and one item involving economic intervention). For the same year, 22 events were found in the Recorder and the Diary combined. This includes two domestic economic health indicators, 4 social policy assessments, 3 cases of repression of individual rights and 5 of group rights, one mass protest, 2 governmental changes, and 5 incidents of governmental economic interference. The governmental changes listed in both sets are identical; this is the only category in which the two sets coincide. Facts on File apparently failed to include many significant internal events in the UAR during 1966.

For example, under the repression of rights category, there were several occurrences found in the Recorder and the Diary which would point toward an indication of internal strife or which would perhaps forewarn of civil unrest or mass protest. The Recorder lists the following incident: "It was announced on May 29 that 71 wealthy businessmen and pashas were being put under restricted movement in a surprise move by the Government. No reasons for the restrictions were given. Informed sources said that the action was designed to prevent them from going to the countryside and influencing political developments." The Diary lists several similar incidents, including the fact that during the summer of 1966, the government completely abolished an influential opposition group called the Muslim Brotherhood by sentencing several of the members to death and imprisoning the remaining 700 members.

Some other significant internal events which were omitted from Facts on File and subsequently from the ISP data set include several government programs to boost national production and increase the amount of exportation of goods, an

announcement that the crime rate in Egypt had decreased by 23 percent since 1952, and a statement by then-President Nasser that the establishment of a multi-party political system would not be permitted in the UAR.

The events found in both data sets for 1970 match much more closely than was the case for 1966. The ISP indicator system featured 1 international economic health indicator and 7 governmental changes; the Recorder and the Diary found two domestic economic health indicators and five governmental changes. Neither set listed any occurrences for the other eight categories. While this low number of events may seem to indicate that both sets failed to adequately uncover internal developments for that year, it should be noted that in 1970 Egypt was deeply involved in the "War of Attrition" with Israel; citizen and government efforts were for the most part aimed toward the Sinai front rather than toward domestic concerns during that time.

In 1975, the events were, as was the case for 1966, more diverse in nature. The ISP set yielded one domestic health indicator, five cases of individual repression and one of group rights repression, two mass protests, and five governmental changes. The Recorder and Diary set listed basically the same diverse set of events as those found in the ISP set, with the exception of a centrifugal political tendencies item: the formation of a new political party. Both sets included the same cabinet changes and the same incidents of public demonstrations over the high cost of living and demands for higher wages.

The trend appears to be that Facts on File has improved as a source of internal affairs monitoring vis-a-vis the Recorder and the Diary. Table 3-8 summarizes the findings.

	1966		1970		1975	
	ISP*	R&D*	ISP*	R&D*	ISP*	R&D*
International Economic Health			1			
Domestic Economic Health		2		2	1	1
Social Policy Assessment		4				
Natural Disaster						
Government Repression of Individual Rights		3			5	
Government Repression of Group Rights		5			1	3
Anti-Regime Acts						
Mass Protest		1			2	1
Governmental Change	2	2	7	5	5	3
Governmental Economic Intervention	1	5				
Centrifugal Political Tendencies						1
Totals	3	22	8	7	14	9

*ISP is the Internal Situation Profile data set; "R&D" stands for the combined data set of the African Recorder and the Africa Diary.

ISP DATA SOURCES: A COMPARATIVE PROFILE

Table 3-8

In 1966, Facts was clearly not an adequate source. By 1975, however, the coverage of internal events and conditions in Facts was comparable if not identical to the two other sources combined. This finding is not unequivocal given the limited nature of the study. Until further analysis can be made, reliance upon a single source is not recommended. At

least one or two additional sources such as the Africa Diary and the African Recorder should be employed along with Facts on File to supplement and enhance the accuracy of the ISP data set.

3.5 Development of the Interstate Indicator System

3.5.1 Overview of the Problem. Our initial work in the interstate realm has built upon research which was conducted by the Interstate Behavior Analysis Project. More specifically, we have concentrated on two major clusters of indicators: measures of interstate behavior and measures of the characteristics of the interstate context or global milieu. Given the extensive prior research in this area of inquiry, we did not confront the massive conceptual and operational problems which pervade efforts to design and operationalize intrastate indicator systems.

3.5.2 Interstate Indicators. Interstate indicators refer to the phenomena which define the relationships between the state and other actors in the international arena. Traditionally, foreign policy analysts have considered three distinct forms of interstate influences upon state behavior: action-reaction processes; dependency/interdependency relationships; and alliance/coalition formations.[44]

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[44] No effort was made to operationalize alliance/coalition formation factors. Among the circumstances which mitigated against converting this realm into an operational set of indicators were problems of data collection, of index development at a conceptual level, of conceptual distinctions between the interstate and global realms, and of distinguishing between the static and dynamic poles of the continuum.

The stimulus-response analogy has been a pervasive model in international politics and foreign policy analysis. The stimulus-response or action-reaction model has received impressive theoretical support and -- a relative rarity in social science research -- equally convincing empirical verification.

Research on interstate political indicators has proliferated in the past decade. The so-called events data movement in international politics has generated an array of data sets and an imposing number of empirical studies (see Burgess and Lawton, 1972; Daly and Davies, 1978; Kegley et al., 1975). As noted ealier, the World Event/Interaction Survey (WEIS) data set is the source for the core indicators in the extant Early Warning and Monitoring System at the International Public Policy Research Corporation.

The 1966 to 1970 WEIS data set was used to delineate the core CNCI interstate political indices. Results for a factor analysis of the WEIS behavior received data are presented in Table 3-9.[45] Each state-year (56 states, 1966-1970) constituted a separate case, yielding 56 x 5 or 280 cases.

Three dimensions of foreign behavior received were isolated. The first includes virtually all event types and is a relatively undifferentiated "diplomacy" factor. The second singles out "force" as a separable domain of behavior received. The third dimension consists of yields and rewards.

The utility of distinguishing between the behavior received and sent domains is revealed when the results in Table

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[45]A principal-component solution was employed, with communality estimates replacing the main diagonal elements of the correlation matrix, and a varimax rotation.

	I	II	III	h^2
Yield	.23	.13	(.74)	.61
Comment	(.90)	.18	.21	.88
Consult	(.90)	.28	.18	.92
Approve	(.90)	.18	.16	.87
Promise	(.52)	.35	.41	.56
Grant	(.92)	.14	.19	.91
Reward	.03	.14	(.79)	.64
Agree	(.88)	.08	.21	.83
Request	(.89)	.31	.14	.91
Propose	(.87)	.32	.18	.90
Reject	(.93)	.17	.17	.92
Accuse	(.88)	.41	.03	.95
Protest	(.76)	.22	.10	.64
Deny	(.56)	(.56)	.12	.65
Demand	(.78)	.39	.14	.79
Warn	(.83)	.43	.10	.88
Threaten	(.62)	(.57)	.09	.72
Demonstrate	(.91)	.11	.10	.85
Negative Sanction	(.64)	.24	.25	.53
Expel	(.87)	.11	.02	.77
Seize	(.83)	.30	.18	.81
Force	.08	(.78)	.40	.77
% Total Variance	58.32%	11.50%	8.82%	78.64%
% Common Variance	74.16%	14.62%	11.21%	100.00%

Parentheses indicate loadings greater than or equal to .50.

Table 3-9

FACTOR ANALYSIS OF WEIS BEHAVIOR RECEIVED DATA

1966-1970

VARIMAX ROTATION

3-9 are compared to those in Table 3-10.[46] An inspection of the loading patterns in the latter table highlights the difference between the two realms. The first factor in Table 3-10, which accounts for 49 percent of the variance, includes all event-types which are cooperative in nature. Some conflictual actions also load here; while this is not an undiluted cooperation dimension, we maintain that the underlying causal process operating here is one which merges cooperation with mild forms of conflict which may be perceived as spurs to cooperation. This factor is designated "constructive diplomatic behavior." The second factor -- "conflict behavior" -- consists of serious conflict acts. The third dimension is a "force" factor, although other conflict types also load here to an extent.

From the economic determinism which is such an integral aspect of Marxist theory to a panoply of contemporary theories, international economics has played a role of undeniable importance in theories of international relations. As we emphasized earlier, Morse (1972) and various other analysts have singled out interstate economic relationships as key factors in world politics.[47] As Rossa and Fountain (1977: 3) caution, however, the task of identifying indicators of interstate economic relationships is formidable.

Conceptually, interstate economic relationships include: trade, trade barriers, and commodity arrangements; international monetary policies and flows; financial and investment dynamics; foreign aid; and multinational and transnational activities. Each of these exerts an impact upon relationships of interdependency, dependency, and domination or advantage.

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[46]This dimensionalization routine also involved a principal-component solution and varimax rotation; there were 56 states and 5 years of data (280 cases). The behavior received and sent domains are discussed in detail in Rossa et al. (1979).

[47]See also Bergsten and Krause (1975), Parker (1977b: 5-10), and Rossa and Fountain (1977: 2-5).

	I	II	III	h^2
Yield	(.77)	.17	.21	.67
Comment	(.88)	.20	.34	.92
Consult	(.87)	.37	.19	.93
Approve	(.87)	.34	.14	.90
Promise	(.89)	.35	.08	.92
Grant	(.81)	.38	.04	.80
Reward	(.91)	.21	.03	.88
Agree	(.78)	.43	.05	.80
Request	(.82)	.24	.36	.87
Propose	(.91)	.31	.10	.93
Reject	(.68)	.48	.29	.78
Accuse	.37	(.74)	.32	.80
Protest	(.50)	(.74)	.09	.81
Deny	(.80)	.26	.36	.84
Demand	.25	(.84)	.14	.79
Warn	(.67)	(.56)	.37	.90
Threaten	.46	(.51)	.41	.63
Demonstrate	.26	(.70)	.01	.56
Negative Sanction	(.64)	.36	−.05	.54
Expel	.19	(.70)	−.05	.53
Seize	.14	(.63)	.30	.51
Force	.17	.14	(.87)	.81
% Total Variance	49.23%	23.50%	8.50%	81.23%
% Common Variance	60.60%	28.93%	10.46%	100.00%

Parentheses indicate loadings greater than or equal to .50.

FACTOR ANALYSIS OF WEIS BEHAVIOR SENT DATA

1966-1970

VARIMAX ROTATION

Furthermore, analysts must take into account multi-state arrangements and individual state policies, long- and short-term conditions and cycles, and the inescapable confusion of political with economic aspects of interstate relationships.

Interstate economic exchange captures the most central aspects of interaction in the economic sphere. When considering states as entities, it is obvious that relationships are formed by change. When we deal with the resources of states and their flows, we focus upon the state's position in the interstate resource market place. Resource production, consumption, and flow define the exchange relationships among states.

The limitations of data availability and the intentional decision to delimit a compact system of indicators dictated the specification of eight indices (based on total trade, import, export, and energy trade data). Four deal exclusively with one commodity (energy or food), one treats the overall relations of a state, and three attempt to combine commodity-specific information into single scales of overall relationships. The eight indices are listed below, along with the three behavior received indicators. Appendix A provides the formulas for computing the eight indices.

Interstate Energy Relationships

1. Energy interdependence
2. Energy dependency
3. Energy market strength

General Trade Relationships

4. Neo-colonial dependency
5. Economic involvement (total merchandise trade)

Food Dependency and Advantage

6. Food dependency

General Interstate Economic Relations

7. Import sector dependency (concentration of imports)
8. Export sector dependency (concentration of exports)

Behavior Received

1. Diplomatic behavior received
2. Force received
3. Rewards (and yields) received

3.5.3 Global Indicators. Prior research has assessed the impact of four types of global factors: the attributes of the global system (such as alliance aggregation and systemic turbulence); the effects of status disequilibrium; subsystemic phenomena; and textural variables or rules and norms of the global system.[48] In developing indicators for the global realm, we sought to delineate factors that could be measured on a state by state basis. Most potential indicators failed to meet this criterion. Such global attributes as alliance aggregation or type of system vary diachronically but not cross-nationally at a single time point. Furthermore, subjective coding requirements and other data collection obstacles intruded in many cases. As a result, we amassed data in only two areas: international governmental organization (IGO) memberships and borders data.

The latter data set is based on the assumption that borders provide automatic arenas of interaction -- and therefore of conflict and crisis. A considerable amount of research

[48] See Fountain and Rossa (1977: 1-2) for details; East (1978a) provides an overview of research on systemic factors.

on the impact of borders has centered around their role in the diffusion of war. We intend to pursue this line of inquiry and also ascertain the relationship bewteen borders and the diffusion of crisis behavior. The discrete global indicators appear below.

International Governmental Organization (IGO) Memberships

1. Total IGO memberships per year
2. Total new IGO memberships per year

Conflict Within Bordering States

1. Direct land borders (conflict)
2. Direct land borders (force)
3. Colonial land borders (conflict)
4. Colonial land borders (force)
5. Direct sea borders (conflict)
6. Direct sea borders (force)
7. Colonial sea borders (conflict)
8. Colonial sea borders (force)

3.6 Development of the State Classification Scheme

3.6.1 Overview. The development and operationalization of the state classification scheme is discussed in detail elsewhere.[49] In the IBA analytical framework, this classification scheme constituted the intervening variable cluster. We assumed that the delineation of viable typing schemes is a prerequisite for generating valid knowledge in any scientific field. Without an ability to type phenomena, analysts confront the difficult -- and perhaps insoluble -- task of explaining the behavior of individual units of analysis.

Our initial conceptualizing in this sphere posed three crucial methodological issues. The first involves the juxtaposition of stable attributes and dynamic factors. Basic structural

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[49] See Wilkenfeld et al. (1978a, 1978b).

characteristics of states are stable attributes which differ in nature and effect from factors which are more dynamic in quality and are subject to short-term fluctuations. The latter factors constitute performance characteristics while the set of stable attributes represents the static context within which foreign policy decisions are formulated. This structure/performance distinction will be emphasized in our future work on crisis indicators.[50]

A second methodological issue pertains to the type of index which the typing scheme will generate. We recognized that prior foreign policy research had tended to employ one variable for each classificatory realm. The political dimension, for example, subsumes an array of discrete variables and general factors; in empirical research, the dimension was frequently reduced to an accountability measure which was operationally tapped by a freedom of the press index. Similarly, the economic factor was often equated with economic development; the latter was then operationalized with gross national product per capita. Similarly, total gross national product was employed to represent the size dimension. For both scientific and warning/monitoring purposes, a multiple indicator strategy is preferable.[51]

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[50]This dichotomous distinction is relevant to inquiry on the question of whether indicators of set X "lead" indicators of set Y. For example, prior research has probed the temporal relationship between political and military indicators of international crises (see Daly, 1977a). The determination of associations between and among concurrent and lagged indicators from various substantive realms should receive more attention. We maintain that the static-dynamic dichotomy should be viewed as a continuous dimension; at various points along the continuum, indicators can be pinpointed. Distinctions between static attributes and varying dynamic indicators could form the basis for the creation of a genuine "multi-tiered" tracking and warning system.

[51]One obvious advantage of a multiple indicator strategy is that an index would provide more reliable warning and monitoring information than a discrete indicator. Furthermore, one indicator may prove to be useful for one type or aspect of crisis behavior whereas another indicator from the same general cluster may "track" successfully for another type or aspect of crisis behavior.

A third issue concerns the appropriate level of measurement. This issue revolves around the relative utility of nominal versus interval and discrete versus continuous measurement. The "loss" of information when analysts employ nominal and discrete data is considerable. Dichotomous distinctions simply fail to capture the "essence" of reality in a meaningful fashion. The CNCI state typing scheme is therefore based on the utilization of interval and continuous indicators.

The state classificatory scheme clusters the structural attributes which provide the context in which foreign policy actions are taken into three distinct areas: economic structure; capability (size, military power, resource base); and governmental structure (political development, structure, stability). The generation of actual indicators entailed the specification of 23 initial discrete variables. The overarching classificatory dimensions and discrete indicators are listed in Table 3-11.

3.6.2 Applied Analysis. During the IBA Project, extensive research was undertaken in order to describe and analyze the structural characteristics data set (see Hopple et al., 1977a, 1977b; Wilkenfeld et al., 1978b). In the context of the CNCI research program, the concern is with the applicability of the data set to the tasks of crisis warning and monitoring. As noted at the outset, we view this data set as a core indicator subsystem of the Cybernetics Technology Office Early Warning and Monitoring System.

The state attributes data can be utilized for purely descriptive purposes. For example, if two states are moving in the direction of a crisis sequence, analysts could simply extract from the file pertinent data on characteristics of the participants. Data on such indicators as GNP, energy consumption per capita, total area, total population, military manpower,

A. *Economic Dimension*

1. Gross National Product per capita
2. Percent of Gross Domestic Product originating in agriculture
3. Percent of Gross Domestic Product originating in industry
4. Energy consumption per capita
5. Percent of economically active male population in agricultural occupations
6. Percent of economically active male population in professional-technical occupations

B. *Capability Dimension*

a. Size

7. Total Area
8. Total Population
9. Gross National Product

b. Military

10. Military manpower
11. Defense expenditures
12. Defense expenditures per capita

c. Resource Base

13. Percent of energy consumed domestically produced

C. *Political Dimension*

a. Development

14. Number of political parties
15. Horizontal power distribution
16. Local government autonomy

b. Structure

17. Selection of effective executive
18. Legislative effectiveness
19. Legislative selection

c. Stability (1946–1965)

20. Average number of coups per year
21. Average number of constitutional changes per year
22. Average number of major cabinet changes per year
23. Average number of changes in effective executive per year

Table 3-11

STRUCTURAL CHARACTERISTICS OF STATES: LIST OF VARIABLES

defense expenditures, and defense expenditures per capita could be generated. Trends such as those reported in the CACI (1975) crisis inventory study could be delineated. For example, Moore et al. point out that crises between minor powers increased in frequency during the final seven-year unit of their four trend periods (CACI, 1975: 83). The CNCI state attributes could be employed in a similar fashion with WEIS data, the CACI data set, or some other crisis and/or crisis/conflict data file (e.g., Butterworth, 1976).

In addition to trend delineation and other descriptive tasks, the data set could also be employed for explanatory analysis. For example, does state type show a relationship to crisis behavior? The state groupings which have been generated by Q factor analysis (see Rossa, 1976; Wilkenfeld et al., 1978b) could be used in order to ascertain the relationship between type of state and crisis involvement.

Groupings could also be generated on the basis of one specific dimension of the data set. Does variation on the economic dimension predict to crisis behavior? What about variation on the size, military, resource base, or political dimensions? Do crisis dyads cluster into groupings? How do the different patterns vary synchronically and diachronically? The availability of data for over half of the states in the international system and for a span of ten years -- with the ability to update the data without prohibitive time or cost constraints -- enables basic and applied analysts to develop a variety of models and test competing theories.

A decision has already been made to add the CNCI state attribute typology to the EWAMS as a scanning option. A scan is "an aggregation of countries by some criteria, e.g., a scan defined by geographic location would aggregate countries into

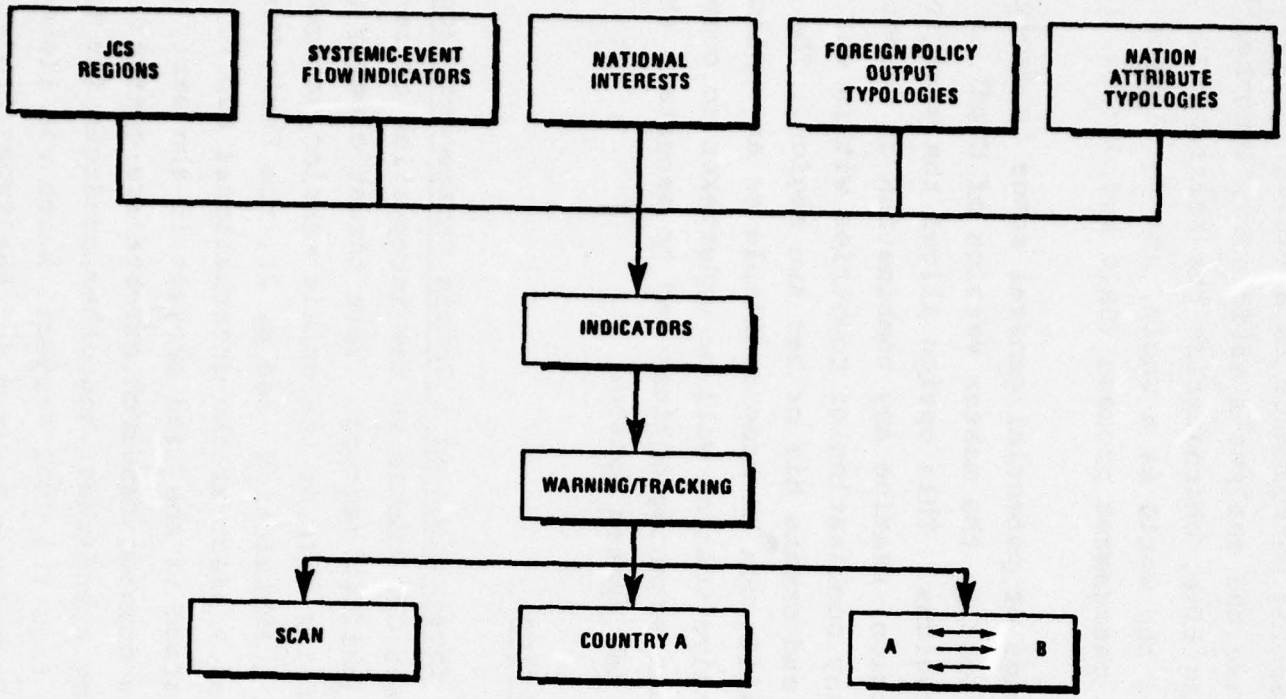
groups such as a Middle Eastern region [Daly and Davies, 1978: 18]." A general scanning capability improves the system's monitoring and warning performance in a variety of ways. General scans increase the analyst's efficiency, lengthen the pre-crisis warning time, characterize the relationship between country pairs and the world as a whole, and facilitate and improve the crisis management process (Daly and Davies, 1978: 21).

The range of potential general scans is depicted in Figure 3-5. Currently, the master version of EWAMS is front-ended with JCS regions. This option allows the analyst to track an entire JCS region, examine any combination of countries within the region (or any combination of countries within and outside of the region), and create his or her own region. The nation attribute scan will soon be made available as an explicit option in EWAMS. Extensive testing will be undertaken to compare JCS and CNCI attribute scanning options and to ascertain the general utility of this new system option.

3.7 Data Integration

3.7.1 Integration as a Crisis Management Program Goal.

One of the current CMP themes is the integration of research products into a unified package. This thrust clearly prevails on the early warning side of the crisis warning/management effort. As Table 1-1 indicates (see p. 2), the Early Warning and Monitoring System Project at the International Public Policy Research Corporation is the lead project in the early warning domain. Various ongoing research efforts are generating data sets, forecasting approaches, and other products for the EWAMS Project. Aside from the CNCI Project, which was linked to the overall Crisis Management Program and the EWAMS Project in the first chapter, these other research thrusts include:



SCANS

Figure 3-5

- Crisis Forecasting Methods (Carnegie-Mellon and the University of Minnesota);
- Predicting International Crises Using Dynamic Systems Analysis (Indiana University);
- Towards a General Forecasting Model for Crisis Monitoring: Predicting Events in China as a Test Case (Michigan State);
- Current World Stress Studies (University of Southern California).

The CNCI data set and indicator system as a product for the Demonstration and Development Facility (DDF) of DARPA-CTO is the subject of the following section. Hopefully, other contractors and users will conduct a variety of analyses with the CNCI data. Only as a result of extensive applications can definitive conclusions be made regarding the utility, reliability, and validity of the data as an international affairs indicator system.

3.7.2 Delineation of Options.[52] The CNCI Project has assembled a massive data-set, integrating various information sources for analytical purposes. Over 300 discrete variables and indicators are measured for 77 countries over a period of ten years.[53] The data set, which is unique in its coverage and is capable of being extended to other states and time periods, provides a wealth of statistical information for academic and policy analysts.

The potential utility of the CNCI data to the policy/intelligence analyst is the subject of this section. The fundamental initial decision concerns the manner in which the data are to be rendered accessible to the analyst. Three options

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[52]This section was initially written by Paul J. Rossa; see also Rossa (1978a, 1978b).

[53]The various variables and indices are listed in Appendix A.

can be delineated:

- A Data-Retrieval System;
- A Data-Analysis Package;
- A CNCI-EWAMS Integrated System.

The first option proposes an independent product which permits the analyst to selectively display information gleaned from the CNCI data base. The Data-Analysis Package is one step advanced: the analyst is provided with statistical/analytical tools which can be used to study the data on a selective basis. The third option involves the direct application of CNCI data to EWAMS (in order to enhance the other features of the system) and the possible integration of CNCI Data-Retrieval and/or Data-Analysis options into EWAMS.

These three possible products of the CNCI data collection effort are discussed below. A final product decision, however, does not necessarily involve only one option. Indeed, the three products may be simultaneously developed. Figure 3-6 portrays the options in flowchart form.[54]

The simplest product involves the programming of a decision-aid which displays information on a selective basis. The CNCI data set could provide answers to many questions of a statistical nature (for any selected country or groups of countries). The following types of information could be displayed for an analyst:

- State Attribute data, 1966-1975 (GNP, defense expenditures, population, etc.);
- Energy Data, 1966-1975 (consumption, production, exports, imports);

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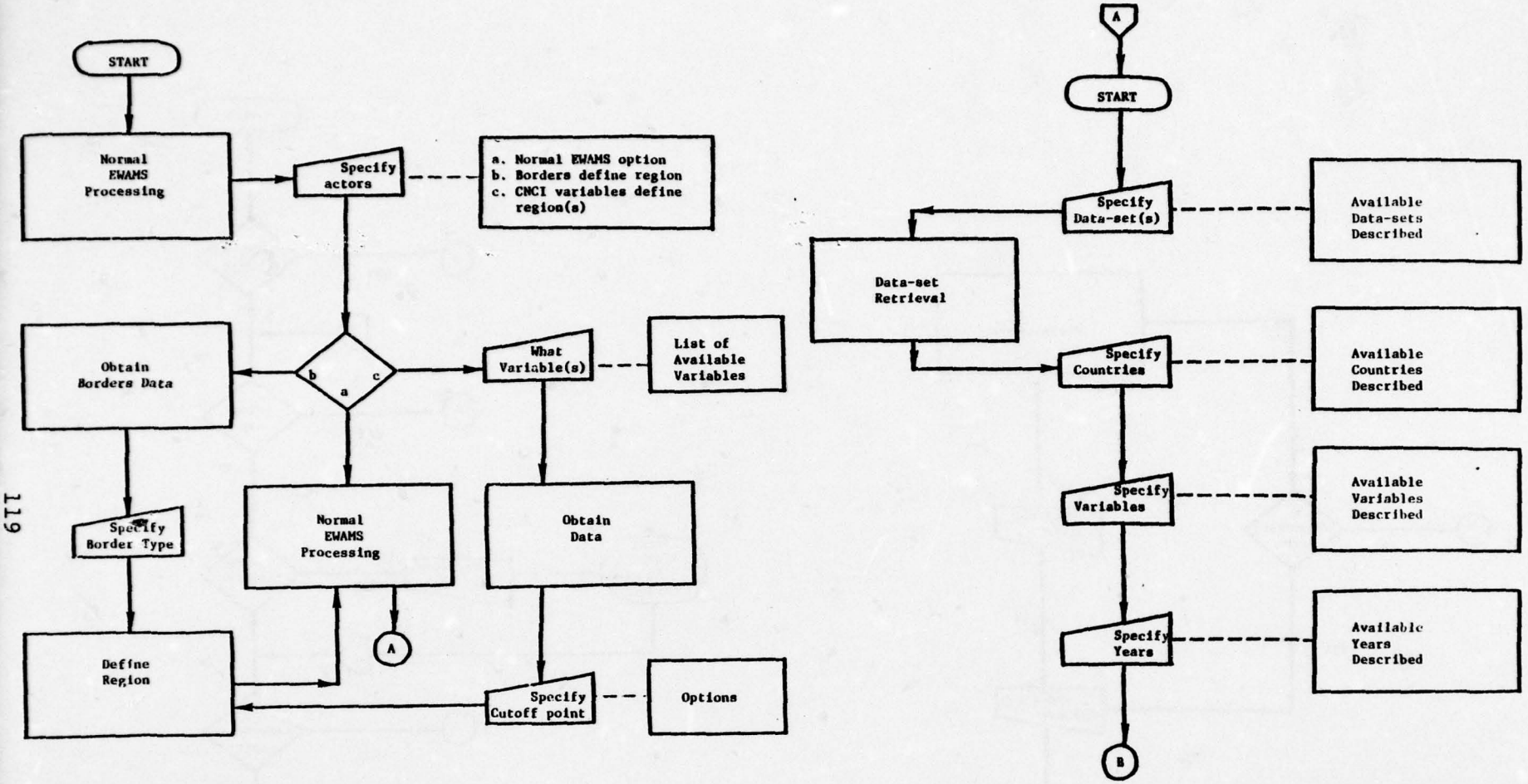
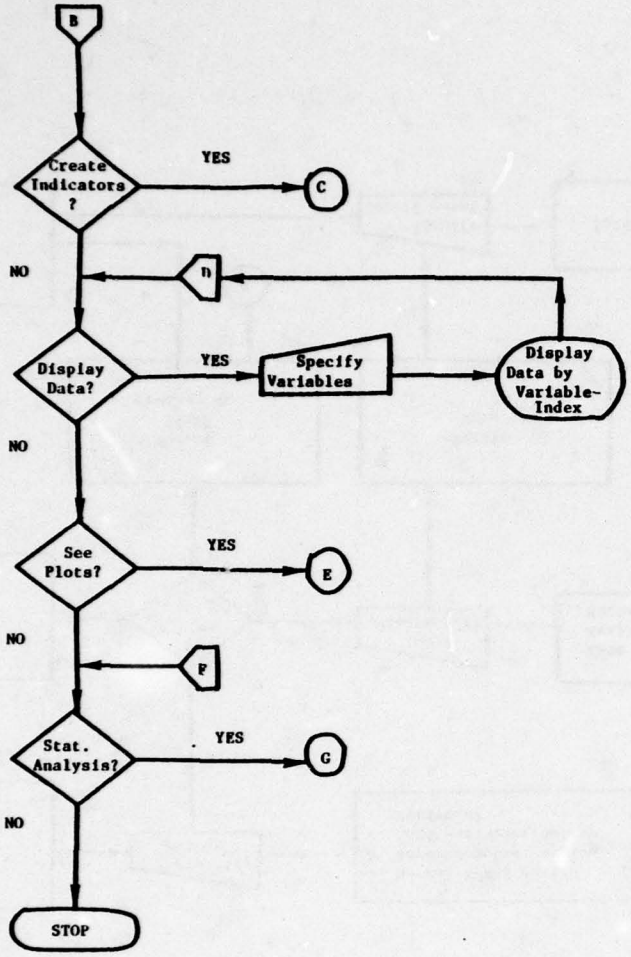
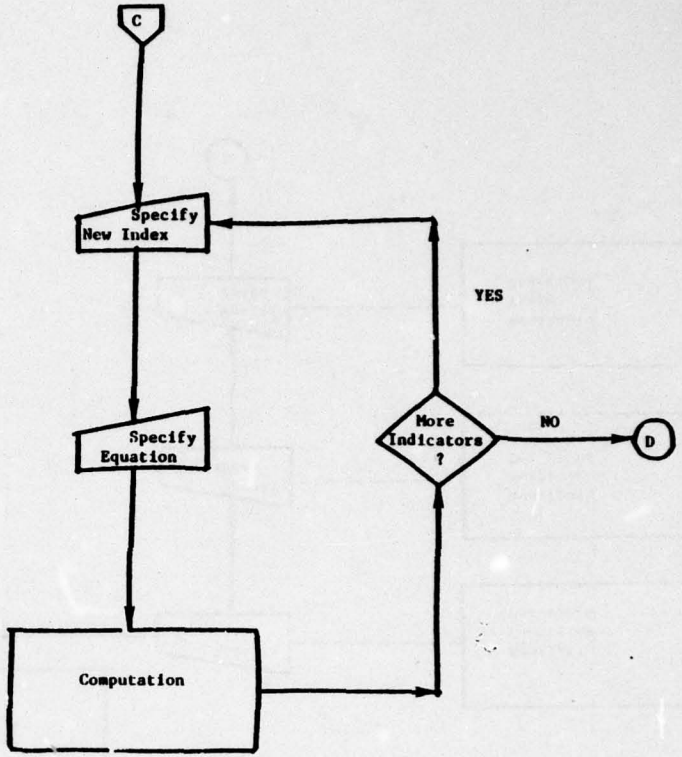
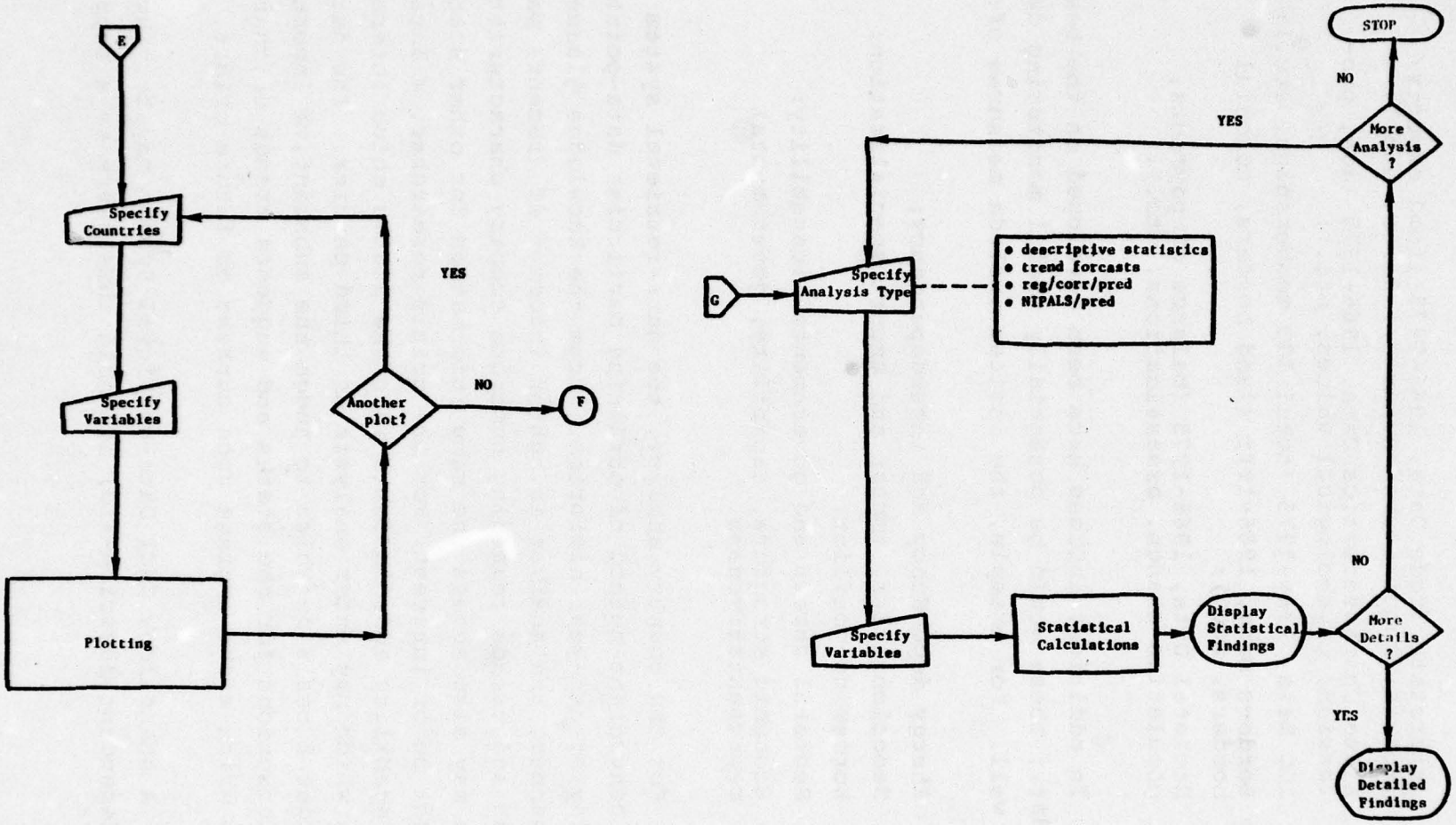
[54]See also Appendix B, which presents a more technical discussion of design decisions for a final CNCI product.


START
Normal EWAMS Processing
Specify actors
a. Normal EWAMS option
b. Borders define region
c. CNCI variables define region(s)
Obtain Borders Data
b
a
c
What Variable(s)
List of Available Variables
Specify Border Type
Normal EWAMS Processing
Obtain Data
A
Define Region
Specify Cutoff point
Options
A
START
Specify Data-set(s)
Available Data-sets Described
Data-set Retrieval
Specify Countries
Available Countries Described
Specify Variables
Available Variables Described
Specify Years
Available Years Described
B


B
Create Indicators ?
YES
C
NO
D
Display Data?
YES
Specify Variables
Display Data by Variable-Index
NO
See Plots?
YES
E
NO
F
Stat. Analysis?
YES
G
NO
STOP


C
Specify New Index
YES
Specify Equation
More Indicators ?
NO
D
Computation



CROSS-NATIONAL CRISIS INDICATORS (CNCI) DATA: OPTIONS DELINEATION

Figure 3-6

- Interstate Trade Data, 1966-1975 (food exports/imports, manufactured exports/imports, etc.);
- Elite Characteristics Data, 1966-1975 (age, profession, psychological values, etc.);
- IGO Data, 1966-1975 (total IGO memberships, etc.);
- Borders Data, 1966-1975 (land borders, colonial borders, etc.);
- Societal Data, 1966-1975 (balance of payments, population change, assassinations, etc.).

In addition, indices have been developed on the basis of this data; these would be potentially useful monitoring devices as well. For example, the indices include measures of:

- Energy dependency and interdependency;
- Neocolonialism, import and export specialization;
- Bordering conflict;
- Societal unrest and governmental instability;
- Economic structure, capability, governmental representativeness.

For the country analyst, the data-retrieval system offers a convenient method of obtaining particular data-points and displaying ten-year histories. From the knowledge gleaned in this manner, the analyst is better informed of (recent) past conditions and trends regarding numerous country characteristics; he or she may also access the same information for other states which might be of interest. For the crisis researcher, a data-display capability adds insights into the states which interact and those which may enter analysis as third parties. The data-set provides a basis on which to judge the substantive import of event-interactions for the states and suggests trends or characteristics which might impinge upon current or future crises.

A standalone CNCI Data-Retrieval System may be viewed as an independent decision-aid; it would thus serve as a supple-

mentary tool to EWAMS. In order to increase the informational capacity of the data base, a continuing program of data enhancement should be strongly considered for the purposes of extending the coverage to all states and to the most recent time-frame.

Beyond an ability to access information about states, the CNCI data base may be used for analytical purposes. Such analytical work has been undertaken by the CNCI Project itself, but an almost infinite number of analyses can be prescribed. For example, three levels of analysis are available:

- Time-series: one country over time;
- Cross-sectional: two or more countries compared;
- Cross-sectional time-series: two or more countries compared over time.

Currently, data for 77 countries are available for 10 years (for most of the variables).

Several types of analysis are also conceivable. The analyst may generate one or more of the following:

- Plots;
- Descriptive statistics;
- Projections;
- Hypothesis testing;
- Model construction;
- Indicator development.

For some of these options, CNCI data would necessarily interface with the WEIS data base. For each of these functions, statistical programs could be offered to the user.

The data-analysis package may be designed to include the data-retrieval system discussed above. In this case, the

plotting capability would simply be adjusted to permit data listing as well. An alternative approach would selectively add statistical options to an information retrieval system.

The advantage of the data-analysis package is the inclusion of a comprehensive data set together with a variety of analytical procedures. As an applied research product, the data-analysis package would supply not only information about states; it would also permit various manipulations of the data.

A final potential product is a fully-integrated CNCI-EWAMS program, foreshadowing an envisioned EWAMS which integrates a number of data sets. Rather than (or in addition to) developing standalone CNCI products, the data could be used to enhance EWAMS. Three integration possibilities can be considered:

- Enhanced scanning ability;
- Data-Retrieval system within EWAMS;
- Data-Analysis package within EWAMS.

The enhancement of EWAMS scanning capacity, which was discussed briefly in the preceding section, assumes the incorporation of additional region-defining criteria. First, scans of interaction between a state and its neighbors can be developed by applying BORDERS DATA. This would allow a country analyst the ability to search for crises where they are most serious (in terms of a potential for military conflict for most states), probable (thus reducing scan selection time/effort), and "interesting" (from the viewpoint of a region specialist). In addition, World scans can be followed by neighbor scans for purposes of interpretation.

A second scanning enhancement, which has already been initiated, derives from the CNCI nation typology, which defines 5 regions of states based upon their characteristics. These groupings will supplement JCS regions by offering another typing criterion.

A third enhancement would allow region-definitions based upon selected measurement criteria. The user may specify a region by referencing one (or more) variables in the CNCI data set, denoting the threshold values of the variable. For example, scans could be performed for a "region" defined as energy-dependent countries, or balance of payments troubled states, or high food-import states. Thus, scans for IRAN versus LAND BORDERS, versus ENERGY DEPENDENT STATES, or versus WEST STATES are made possible.

Besides the scanning enhancements, EWAMS could incorporate Data-Retrieval System features. In this manner, the researcher may access the CNCI data-base before or after his "crisis runs" to obtain supplementary information. When a crisis seems likely, for example, information regarding bordering states, the trade balance, elite characteristics, etc., may provide helpful information. Finally, EWAMS might incorporate a Data-Analysis Package as a supplementary set of analytical tools. In this manner, crisis runs can be preceded or followed by various statistical manipulations of CNCI and WEIS data.

All of the foregoing CNCI data set products are potentially useful as analytical aids. Each requires software development and provides information via human-computer interaction. Each builds upon prior task completions: a Data Retrieval System upon Data Assembly; a Data-Analysis Package upon Data-Retrieval; and EWAMS integration (potentially) upon a Data-Analysis Package. While each step in the sequence requires development, we may bypass independent product generation in favor of a single product.

A major consideration in choosing features for this product from the myriad of possibilities is the coverage of the data base. Although more countries, more variables, and more years distinguish our data from other sets, many countries are excluded and the years are not inclusive or "current." The final

product must therefore be labeled "prototypical." Indeed, the initial product development effort could be limited to a small set of states included in the sample (e.g., the Middle East) during important crisis periods. In any event, extended coverage must be attained prior to the completion of any of the three decision aids beyond a prototype stage.

Finally, we should offer a comment about data aggregation. The CNCI data set contains only yearly data while WEIS is daily and analysts often utilize weekly, monthly, or quarterly aggregations. While this divergence causes no problem in either data-retrieval or CNCI-based region specifications (in EWAMS scans), difficulties surface when analysis focuses upon the relationship between the CNCI data and interstate interactions and WEIS data. In essence, WEIS is normally aggregated at a lower level than CNCI. Thus, CNCI data cannot account for WEIS fluctuations over time. Furthermore, CNCI is monadic and does not vary with the target as does WEIS.

This aggregation problem obviates all but a contextual role for CNCI data when analyzing monthly WEIS-based data. However, at least two other analytical roles may be envisioned. First, yearly WEIS data can be analyzed (perhaps forecasted) with CNCI data. Aggregating WEIS at a yearly level does not allow for crisis warning, but warnings derived from unusual yearly event frequencies might indicate a possible impending crisis period; for example, an unusually high level of conflict involving the U.S.S.R. in a given year (present or future) may indicate a crisis during that year. Yearly aggregations might be developed as leading indicators in this manner, with CNCI data being used to aid in the forecasts.

Secondly, CNCI yearly data may be used to differentiate "false alarms" and "misses" from "hits." Analyses concerning the question of which levels of crisis indicators foreshadow actual crises may depend upon the characteristics of the involved states.

For example, we can explore the possibility that lower tension levels might indicate a crisis when capabilities are similar and a border exists between states, while a higher threshold is warranted when capabilities diverge and there is no common border.

4.0 MONITORING INTERNATIONAL CRISES: PRELIMINARY FINDINGS FROM HISTORICAL DATA[1]

The research which is presented in this chapter involves the confluence of events data and crisis analysis. As noted, the extant Early Warning and Monitoring System features dynamic political indicators from the external environment. These indicators are recent and current in terms of the temporal dimension. For purposes of tracking and forecasting international affairs, it is especially useful to examine a wide range of cases and time periods. The variable configuration, temporal, and spatial parameters should all be varied as much as possible so that we can determine the proportion of the variance which is explained by time-dependent and actor-related phenomena. Maximizing the variance in temporal and spatial parameters automatically ensures the inclusion of heterogeneous variable configurations.

4.1 Early Warning and Monitoring System Indicator Development

The Early Warning and Monitoring System (EWAMS) Project indicator base is derived from the WEIS data set and consists of such crisis indicators as activity, tension, and uncertainty levels. The indicators operationalize the concepts of volume and variety and refer to one-way and two-way flows (see Figure 2-2, p. 23).

Considerable retrospective empirical testing has been completed on the quantitative international political

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[1]Sections of this chapter are based on Hopple et al. (1978b).

indicators.[2] The core data base in EWAMS -- the DARPA-supported WEIS data -- now consists of over 100,000 non-routine international events for all states for the period 1966 to the present. The nature of the data base has permitted the testing of indicators, probabilities, and thresholds over a large number of historical crises. In addition to the testing and modification of the original indicators, new ones are being developed. Among these are indicators which are designed to increase hit and lower false alarm rates as well as regional and systemic indicators.

The focus of the testing of quantitative indicators has included:

- Indicators of single country activity (Daly and Bell, 1977a);
- Indicators of cooperative and conflictual activity (Davies, 1978b);
- Comparison of political and extant military indicators (Daly, 1977a);
- The tension measure (Daly, 1977b; Davies, 1977).

Recent work on the phenomenon of pre-crisis peaks illustrates the continuing analysis, enhancement, and development of EWAMS indicators (see Davies, 1978b). Pre-crisis peaks occur several months prior to the outbreak of crises and pose the problem of "false alarms." Preliminary evidence indicates that the introduction of the verbal-physical dimension (as a supplement to the cooperation-conflict dichotomy) yields a more sophisticated and accurate events typology for monitoring international affairs and forecasting crisis behavior.

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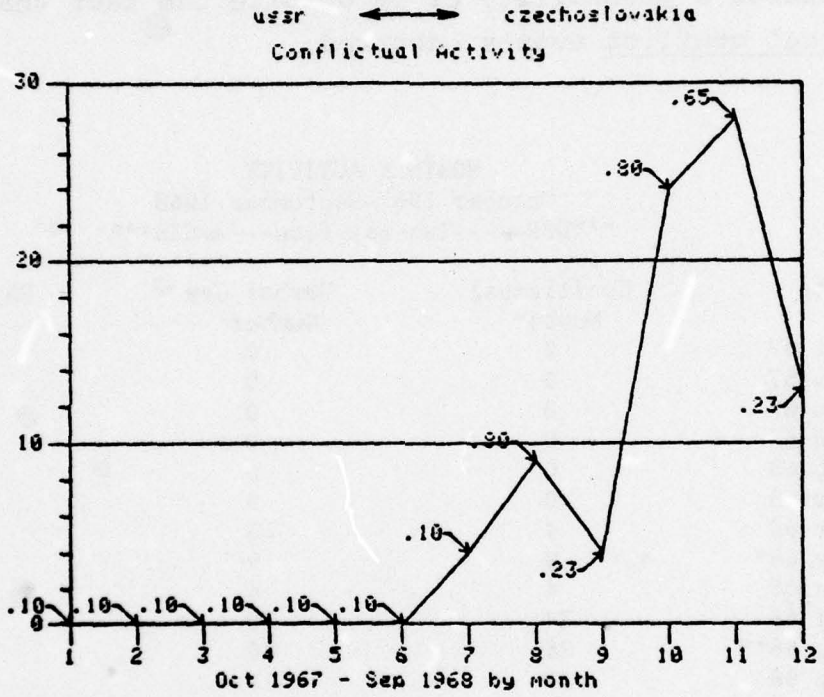
[2]Results for the preliminary test set (the January 1967 Sino-Soviet border clash; the August 1968 Czechoslovakia invasion; the November 1971 Indo-Pakistani war; and U.S./U.S.S.R. dyadic relations from 1966 to 1975) are reported in Andriole (1976: 37-54). More recent indicator development and refinement efforts are chronicled in Daly and Davies (1978: 41-104).

For illustrative purposes, Figure 4-1 portrays the two-way conflict interaction frequencies as well as the conflict probabilities for the Soviet Union-Czechoslovakia dyad in 1968.[3] The pre-crisis peak occurred in May 1968, three months prior to the Soviet invasion in August. In a real-time mode, this upsurge would have produced a false alarm.



Source: Davies (1978b).

Figure 4-1

Two new conflict indicators were then devised. An indicator of the frequency of verbal conflict was produced by summing the number of verbal conflict interactions between the Soviet Union and Czechoslovakia. Included in the index were the WEIS conflict categories reject, accuse, protest,

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[3]Davies (1978b) also analyzed the 1967 Sino-Soviet border clash and the 1971 Indo-Pakistani war; the results were identical to the findings summarized here for the Czech-Soviet case.

deny, demand, warn, and threaten. A second indicator -- physical conflict -- combined the categories demonstrate, reduce, expel, seize, and force.

Table 4-1 provides the results for the total number of verbal conflict events and the number of physical conflict events. In the pre-crisis peak month (May), the dyad exchanged 9 conflictual events (all verbal). The score of 9 registered a probability of .8 despite the fact that no physical conflict events occurred.

MONTHLY ACTIVITY
October 1967-September 1968
USR◄---Two-Way Flow---►CZE

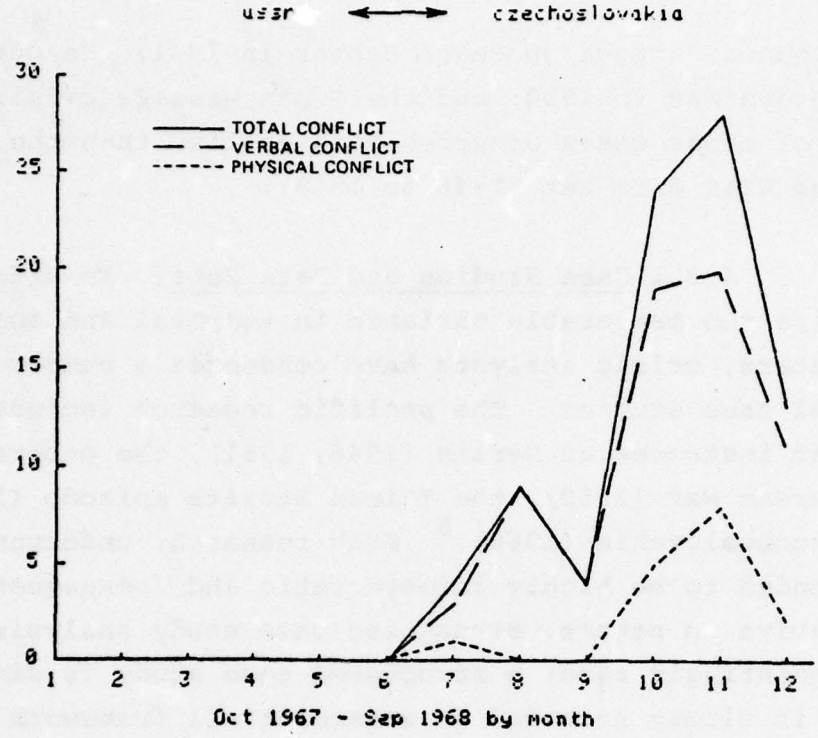
Date	Conflictual Number	Verbal Con Number	Physical Con Number
Oct 67	0	0	0
Nov 67	0	0	0
Dec 67	0	0	0
Jan 68	0	0	0
Feb 68	0	0	0
Mar 68	0	0	0
Apr 68	4	3	1
May 68*	9	9	0
Jun 68	4	4	0
Jul 68	24	19	5
Aug 68**	28	20	8
Sep 68	13	11	2

*pre-crisis peak
**crisis month

Source: Davies (1978b).

Table 4-1

The dynamics of the pattern are clearly reflected in Figure 4-2. This graph is a plot of the three conflict indicators over time. Verbal conflict events increased significantly during the pre-crisis peak -- and generated a false alarm. Physical conflict events, however, tended to parallel total conflict in the genuine crisis period.



Source: Davies (1978b).

Figure 4-2

The current monthly, quarterly, and yearly indicators in EWAMS will soon be supplemented by quantitative political indicators for weekly and daily warning and monitoring. Additionally, economic, military, and internal indicators will be integrated into the EWAMS. These and other envisioned enhancements and modifications are discussed in Davies (1978a) and IPPRC (1978b).

4.2 Development of Historical Crisis Cases Data Sets[4]

The focus here will be on four historical crisis periods: the German invasion of the Soviet Union in 1941;

[4]The data were collection under the supervision of the author and Jonathan Wilkenfeld, both of whom rendered professional consulting services to DARPA under Essex Contract No. MDA-903-75-C-0227. The data set is described in detail in Appendix C.

the Japanese attack on Pearl Harbor in 1941; the outbreak of the Korean War in 1950; and the Cuban missile crisis in 1962. Three of these cases occurred much earlier than the period for the WEIS data set (1966 to 1978).

4.2.1 Case Studies and Data Sets. In order to maximize the measurable variance in temporal and spatial parameters, crisis analysts have conducted a number of historical case studies. The prolific research includes such salient instances as Berlin (1948, 1961), the outbreak of the Korean War (1950), the Taiwan Straits episode (1955), and Czechoslovakia (1968).[5] Such research, unfortunately, has tended to be highly idiosyncratic and (consequently) noncumulative in nature. Structured case study analysis has been disappointingly rare; a structured case study is simply one which is firmly anchored in a theoretical framework or model.

There are few examples of the application of a common framework to a number of cases. The Snyder, Bruck, and Sapin (1962) decision-making framework has been employed to study the Korean War case (see Paige, 1968). The framework constructed by Brecher and his colleagues (1969) has been used to examine crisis and other decision-making cases in Israel (e.g., Brecher, 1975, 1979) and India (e.g., Brecher, 1974, 1977b). Brecher (1977c, 1979) is also utilizing the framework in the International Crisis Behavior (ICB) Project; 27 crisis cases between 1938 and 1976 are currently being analyzed. The ambitious research of Snyder and Diesing (1977) involved the application of systems, bargaining, and decision-making perspectives to 16 crisis cases. The cases, which are listed in Table 4-2, range from the Fashoda crisis of 1898 to the Yom Kippur "alert crisis" of 1973.

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[5] See, respectively, McClelland (1968, 1972); Paige (1968, 1972); McClelland (1962, 1964); and Andriole and Young (1977: 125-131).

1. The Fashoda Crisis of 1898;
2. The Morocco Crisis of 1905-1906;
3. Bosnia, 1908;
4. The Morocco Crisis of 1911;
5. The 1914 Crisis;
6. The Ruhr Crisis of 1923;
7. Munich, 1938;
8. U.S.-Japan, 1940-1941;
9. Iran, 1946;
10. Berlin Blockade of 1948;
11. The Suez Crisis of 1956;
12. The Berlin Crisis of 1958-1961;
13. The Quemoy Crisis of 1958;
14. The Lebanon Crisis of 1958;
15. The Cuba Crisis of 1962;
16. The Yom Kippur "Alert Crisis" of 1973.

Source: Snyder and Diesing (1977).

LIST OF CRISIS CASE STUDIES

Table 4-2

Generally, however, case-specific empirical research and abstract frameworks have both proliferated without interacting. The absence of structured case study work is underlined when the relative paucity of comparative case studies is noted. Among the few exceptions are Paige (1972) and McClelland (1972). The efforts of Brecher and his colleagues in the ICB Project should significantly rectify this state of affairs.

Recently, the data base for the comparative, quantitative analysis of international crises and conflict situations has expanded. Brecher (1977c: 45) has amassed data on 390 pre- and postwar crises and 79 intrawar crises from 1938 to 1975; plans have been made to update the data base to 1978. Butterworth (1976, 1978) has collected data on 310 interstate security conflicts which occurred during the 1945-74 period. The CACI inventory of crisis incidents involving the United States from 1946 to 1975 includes 289 cases (Hazelwood et al., 1977: 80).[6] Contained within the more than 100,000 events

[6]The updated (1946-1976) data base in the executive aid includes 307 crises (CACI, 1978b); also relevant is the Soviet crisis data base (CACI, 1978a).

of the WEIS/EWAMS data file are numerous crisis sequences; the current EWAMS probabilities are based on 27 international crises from 1966 to 1975 (see Table 4-8 below; Daly and Bell, 1977b). Additionally, two "international incidents" data bases focus on military-related crises; the CNA (1977) list includes 99 responses to incidents and crises involving the Navy and Marine Corps between 1955 and 1975 while the Brookings study (Blechman and Kaplan, 1976) identifies 169 actions involving the four services during the same time frame.[7]

4.2.2 Historical Crises: Descriptive Data. The Pearl Harbor, Korean War, and Cuban missile crisis cases which constitute the focus of this chapter combine the case-specific features of the Brecher, CACI, and Butterworth data sets with a WEIS-based events data foundation. Standard WEIS coding rules and routines were employed for each case (see McClelland and Young, 1969). Coders recorded information in terms of the questions "who" did "what," "to whom," and "when." Specifically, information was collected for day, month, and year (when), initiator (who), target (to whom), source (the New York Times), and arena (Pearl Harbor, etc.). The "what" question was answered by assigning the event to one of the 22 WEIS cooperation-conflict categories (see Table 2-1). Details are provided in Appendix C.

Data were collected for the principal actors in each crisis and spanned a period from approximately 18 months prior to the crisis to one month subsequent to the actual crisis. Prior to the actual coding, coders were carefully trained in the WEIS coding procedure. For estimating reliability, each individual coded data for the 15-day period from

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[7] Brookings is currently conducting research on the use of Soviet armed forces in crises (Kaplan, 1979).

August 1 to August 15 (1941) for all states in the crisis and for all 22 of the WEIS categories. Coder reliability scores were calculated with the following formula:

$$\frac{2M}{N1 + N2},$$

where M is the number of agreements between two coders, N1 is the total number of a certain category of events found by coder 1, and N2 is the total for coder 2. The average coder reliability score for the group of four was .74; reliability coefficients for the various pairs ranged from .65 to .80.

Descriptive data on the Pearl Harbor, Korean War, and missile crisis cases are presented in Tables 4-3 and 4-4.[8] Table 4-3 provides event frequencies by sender and target for the three cases. In the Pearl Harbor case, 3851 events were sent from the six senders (the U.S., Britain, Germany, Italy, the U.S.S.R., and Japan) to another actor from among the group of six. The United States sent 966 events and Britain was second with 849 events; the two powers together accounted for 47 percent of the 3851 events. Third was Germany (757 events); Japan sent a total of 666 events. The Soviet Union sent 346 events while Italy sent 273 events.

The event total for the Korean War case was 771. The U.S. sent 314 events, the Soviet Union 228, and China 99. North Korea sent only 36 events and South Korea sent 84. It is clear that most of the events involved the U.S.-U.S.S.R. dyad; the United States sent 207 of its 314 events to the Soviets while the Soviet Union sent 190 of its 228 events to the United States.

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[8]For the Pearl Harbor case, the data are based on the entire time frame (January, 1940 to January, 1942) for the World War II cases (i.e., Pearl Harbor and the German invasion of the Soviet Union). Only the former case will be discussed here.

A. Pearl Harbor

Target	Sender US	Britain	Germany	Italy	USSR	Japan	Total
US		410	281	112	123	371	1297
Britain	359		214	77	119	142	911
Germany	69	118		39	37	21	284
Italy	108	73	94		9	32	316
USSR	169	147	99	16		99	530
Japan	261	98	68	29	57		513
Total	966	849	757	273	346	666	3851

B. Korean War

Target	Sender US	USSR	China	N. Korea	S. Korea	Total
US		190	72	8	54	324
USSR	207		25	4	8	244
China	47	25		1	1	74
N. Korea	17	6	1		21	45
S. Korea	43	7	1	23		74
Total	314	228	99	36	84	771

C. Cuban Missile Crisis

Target	Sender US	Cuba	USSR	Total
US		234	208	442
Cuba	231		48	279
USSR	177	39		216
Total	408	273	256	937

FREQUENCIES FOR EVENTS SENT AND RECEIVED BY CRISIS ARENA

Table 4-3

Event Type	Pearl Harbor	Korean War	Cuban Missile Crisis
1. Yield	0.75%	0.52%	0.85%
2. Comment	18.64	24.77	27.32
3. Consult	19.52	6.61	9.81
4. Approve	6.94	4.41	4.37
5. Promise	2.51	1.30	1.71
6. Grant	1.55	1.82	4.70
7. Reward	2.25	1.69	0.64
8. Agree	5.25	2.08	2.35
9. Request	2.72	3.76	1.60
10. Propose	1.99	2.98	2.35
11. Reject	2.85	4.15	3.20
12. Accuse	11.62	30.35	17.08
13. Protest	2.98	2.59	3.42
14. Deny	5.15	1.30	5.66
15. Demand	0.65	2.08	1.60
16. Warn	3.18	1.82	3.95
17. Threaten	1.27	1.04	1.28
18. Demonstrate	2.15	3.24	2.56
19. Reduce relationship	2.05	1.04	2.03
20. Expel	0.70	0.39	0.64
21. Seize	3.62	0.78	1.92
22. Force	1.66	1.30	0.96
Total number of events	3851	771	937

EVENT TYPE DISTRIBUTIONS BY CRISIS ARENA

Table 4-4

During the Cuban missile crisis period, the six directional dyads (U.S.-Cuba; U.S.-U.S.S.R.; Cuba-U.S.; Cuba-U.S.S.R.; U.S.S.R.-U.S.; U.S.S.R.-Cuba) exchanged a total of 937 events. The U.S. sent 231 events to Cuba and 177 to the Soviet Union; Cuba sent 234 events to the U.S. and 39 to the Soviet Union; the Soviet Union sent 208 events to the U.S. and 48 to Cuba.

Breakdowns by event type appear in Table 4-4. The three cases display generally comparable distributions, although some noteworthy differences can be isolated. One of these is the consult category. Almost 20 percent of the events in the Pearl Harbor case were consultations; the percentages for Korea and Cuba were 7 and 10, respectively. Grant acts (expressions of regret and apologies, giving state invitations, grants of asylum, etc.) comprised about 5 percent of the total for the Cuban missile crisis but only 2 percent for Korea and 1.5 percent for Pearl Harbor. Over 5 percent of the Pearl Harbor events were agreements, while the percentages for the other two cases were both about two percent. Significant differences emerged for the accuse category: 12 percent for Pearl Harbor; 30 percent for Korea; and 17 percent for the Cuban missile crisis. Acts of seizure (seize position or possessions; detain or arrest a person or persons) were relatively more frequent in the World War II case: 3.7 percent for Pearl Harbor; 0.8 percent for Korea; and about 2 percent for Cuba.

One other descriptive statistic should be noted. The first 10 WEIS types in Table 4-4 are cooperative in nature while types 11 to 22 consist of various types of conflictual events. The proportion of cooperative events ranges from 62 percent (Pearl Harbor) to 56 percent (Cuban missile crisis) to 50 percent (Korean War). Over one-half of the missile crisis and Korean War cooperative acts were comments; cooperation during World War II was much more varied. An

international crisis or conflict phase involves more than negative spirals between adversaries, whether the contestants are dyads or multilateral alliances. The interactions between and among allies are important data for mapping and forecasting crises. Previous research has established that both volume and variety increase in a crisis period (see McClelland, 1972). The mix of cooperation and conflict is a key indicator for tracking or monitoring interactions between hostile actors in the interstate arena. For both allies and enemies, cooperation-conflict distributions should be measured and evaluated.

4.3 Empirical Mapping: Procedures

The data analysis in this study will be intentionally descriptive and unrefined in nature. Our initial objective entails an attempt to delineate the salient profiles and trends which characterize the data for the three cases. Sigler's (1971) approach to monitoring international interactions will be employed here.[9] Sigler's (1971: 107) fundamental goal was the exploration of "the utility of measures of international tension [i.e., events data-based indicators] derived from quantitative content analysis of international news reporting as a means of monitoring international system performance." He employed WEIS data to map cooperation and conflict in U.S.-Soviet-Chinese relations from 1966 to 1971.

Sigler (1971: 108) aggregated the events data on a monthly basis over the 65 months from January, 1966 through May, 1971. The data for the three sets of directed dyads (U.S.-U.S.S.R.; U.S.-China; U.S.S.R.-China) had been scaled on the Calhoun (1971) two-dimensional semantic space scale.

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[9] See also Calhoun (1971) and Driver (1969).

Calhoun used 65 judges to rate the semantic content of the 22 WEIS categories along 41 bipolar adjectival scales suggested by Osgood et al. (1957).

A varimax rotated factor analysis of the judges' ratings yielded nine dimensions which explained 61 percent of the variance. The two-dimensional scale fuses the two most potent dimensions: evaluative (positive-negative) and potency (strength-weakness). The former accounted for 11 percent of the variance and the latter explained 12.5 percent of the variance. The values for the 22 categories are listed in Table 4-5. The positive, cooperative events range from comment

Scale	Value
1. Reward	3.385
2. Consult	2.942
3. Agree	2.780
4. Propose	2.568
5. Grant	2.518
6. Approve	2.514
7. Request	1.241
8. Promise	1.018
9. Yield	.720
10. Comment	.108
11. Reduce relationship	-1.070
12. Warn	-1.668
13. Demonstrate	-1.807
14. Deny	-1.866
15. Protest	-1.982
16. Accuse	-2.653
17. Reject	-2.844
18. Expel	-3.061
19. Demand	-3.181
20. Threaten	-3.342
21. Seize	-3.503
22. Force	-4.044

Source: Sigler (1971: 108).

SCALE VALUES

Table 4-5

(.108) to reward (3.385). The negative, conflictual types include reduce relationship (-1.070) and force (-4.044); the other 10 types in the conflict realm have scaled values between these two extremes.

Sigler (1971: 109) established a net positivity score for each monthly dyad by summing the values for all events. Seven comments from A to B would be scored as .77 (.11 x 7); an exchange which included 1 reward act, 2 grants, and a promise would be summed to 14.45; if A sent B 2 force acts during the month, the net positivity score would be -8.08 (-4.04 x 2). The monthly net positivity scores for the Pearl Harbor, Korean War, and Cuban missile crisis cases are displayed in the next section in Table 4-6 and in Appendix D.

This step is followed by the plotting of net positivity scores over time (Sigler, 1971: 109). Sigler employed Z-scores for this purpose.[10] The Z-scores are a means of identifying peak periods of greater than usual positivity or negativity. The following unilateral and confict-cooperation (dyadic) ranges were posited:

Unilateral

1. Z-score between +1.0 and +2.0: conciliatory;
2. Z-score greater than +2.0: accommodating;
3. Z-score between -1.0 and -2.0: unfriendly;
4. Z-score less than -2.0: antagonistic.

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[10] Z-scores were utilized to isolate peak periods because of the wide differences in means and standard deviations in the score for each state and because of the absence of any norms for such measures in international relations; see Sigler (1971: 109). Standard scores are of course a regular feature of EWAMS indicators.

A. Pearl Harbor

Month	U.S.-Japan	#	Japan-U.S.	#	U.S.-Germany	#	Germany-U.S.	#
JAN 40	.22	2	-8.34	3	0	0	-2.65	1
FEB 40	.11	1	-1.88	2	-.79	3	1.27	2
MAR 40	2.94	1	.32	3	-7.35	4	-1.87	1
APR 40	.11	1	-1.65	3	-1.21	5	-5.79	6
MAY 40	-3.59	3	0	0	-13.75	6	-1.76	2
JUN 40	0	0	0	0	-.78	3	-2.60	6
JUL 40	0	0	-4.52	2	0	0	-.49	2
AUG 40	-1.67	1	.11	1	0	0	0	0
SEP 40	.11	1	.11	1	0	0	-1.98	1
OCT 40	3.29	7	7.70	9	-4.60	3	-3.18	1
NOV 40	3.59	3	-4.24	5	2.94	1	.21	3
DEC 40	.43	4	-4.52	2	2.95	5	-5.36	8
JAN 41	-10.28	10	-7.12	20	-3.91	9	-47.80	21
FEB 41	-12.44	10	-18.55	22	1.56	4	-9.04	14
MAR 41	-13.66	11	-7.91	7	-9.37	7	-31.04	19
APR 41	-1.47	4	-2.75	7	-41.38	19	-35.40	20
MAY 41	-3.37	8	-9.80	10	0	0	-10.86	13
JUN 41	1.28	5	-6.31	9	0	0	-14.98	23
JUL 41	-3.51	7	-18.08	17	0	0	-9.79	9
AUG 41	2.38	25	-11.29	35	0	0	-11.51	10
SEP 41	-5.08	17	1.92	33	0	0	-69.16	33
OCT 41	.17	23	-36.34	50	0	0	-42.60	20
NOV 41	8.07	28	-26.52	56	0	0	-38.09	27
DEC 41	-90.01	78	-106.84	67	0	0	-42.02	29
JAN 42	-17.12	11	-8.32	7	0	0	-21.67	11
Sum	-139.56	261	-274.82	371	-75.67	69	-408.15	281
Mean	-5.58		-10.99		-3.03		-16.58	
S. D.	18.52		22.12		8.83		19.05	

B. Korean War

Month	U.S.-USSR	#	USSR-U.S.	#	U.S.-China	#	China-U.S.	#
JAN 49	-8.84	15	-16.59	10	-1.77	3	-13.26	5
FEB 49	-8.72	11	-15.47	10	0	0	-.59	5
MAR 49	-15.08	15	-11.85	10	-1.76	2	-2.65	1
APR 49	-8.05	11	-22.16	12	.94	3	-4.93	4
MAY 49	.32	3	-3.18	5	.11	1	-5.83	2
JUN 49	-7.42	8	-6.76	5	-3.73	2	-.26	5
JUL 49	-6.12	7	-7.91	10	-3.75	4	-13.94	5
AUG 49	-7.04	8	-5.10	6	-3.47	5	-13.40	7
SEP 49	1.23	10	-9.02	14	0	0	-5.50	2
OCT 49	-15.79	10	-5.20	3	-4.98	5	-1.88	4
NOV 49	3.99	7	-21.20	14	-2.10	2	0	0
DEC 49	2.73	3	-10.18	8	.11	1	-6.97	3
JAN 50	-4.24	4	-13.26	5	-5.20	3	-20.16	8
FEB 50	-18.42	18	-21.78	12	-3.13	3	-7.96	3
MAR 50	-4.76	22	-38.82	18	-5.63	5	-20.87	8
APR 50	-17.00	10	-15.89	9	-4.87	4	-2.65	1
MAY 50	-13.47	13	-17.69	9	.11	1	2.52	1
JUN 50	-9.84	20	-26.07	10	-5.99	2	-12.42	5
JUL 50	-19.54	12	-40.79	20	-2.84	1	-7.11	3
Sum	-156.05	207	-308.92	190	-47.96	47	-137.89	72
Mean	-8.21		-16.26		-2.52		-7.26	
S. D.	7.11		10.53		2.26		6.75	

C. Cuban Missile Crisis

Month	U.S.-Cuba	#	Cuba-U.S.	#	U.S.-USSR	#	USSR-U.S.	#
APR 61	-32.00	66	-100.17	61	-21.50	13	-41.73	30
MAY 61	1.31	21	-28.20	28	-1.70	2	-6.87	4
JUN 61	2.02	15	9.00	10	.32	3	-1.56	2
JUL 61	5.12	6	-5.42	6	.11	1	-4.56	2
AUG 61	-3.08	9	-17.43	14	0	0	.11	1
SEP 61	5.49	9	-8.85	8	-5.08	6	-7.47	3
OCT 61	2.05	12	-26.78	12	0	0	1.46	3
NOV 61	-1.40	8	.11	1	.86	4	7.29	3
DEC 61	-2.24	7	-1.72	4	-1.65	3	-3.29	4
JAN 62	-2.65	1	-9.16	4	11.57	16	12.43	14
FEB 62	-4.39	10	-5.31	2	-.59	14	7.34	13
MAR 62	-4.19	5	-10.36	5	1.01	6	-4.31	5
APR 62	-6.01	5	3.22	6	2.91	7	-2.33	4
MAY 62	0	0	-7.96	3	4.39	5	-16.45	15
JUN 62	-1.87	1	-1.70	2	-3.67	6	-7.88	9
JUL 62	.11	1	-17.45	8	.50	4	1.97	10
AUG 62	1.62	7	-15.63	8	.54	5	-1.65	3
SEP 62	-4.72	12	-17.00	14	-4.48	9	-19.22	17
OCT 62	-14.81	21	-37.89	21	2.95	41	-15.57	42
NOV 62	-11.53	15	-...29	17	15.25	32	19.43	24
Sum	-71.17	231	-328.98	234	1.77	177	-100.21	208
Mean	-3.56		-16.45		.09		-4.88	
S. D.	8.32		23.08		7.01		12.61	

MONTHLY FREQUENCIES AND NET POSITIVITY SCORES

Table 4-6

Dyadic

5. Both conciliatory or one conciliatory and the other accommodating: detente;
6. Mutual accommodation: rapproachment;
7. Both unfriendly or one unfriendly and the other antagonistic: tension;
8. Mutual antagonism: crisis;
9. Shifts by one not reciprocated by the other: unresponsive behavior;
10. Shifts by one met by shifts in the opposite direction by the other: contradictory behavior.

4.4 Results

4.4.1 Net Positivity Scores. As noted, the net positivity scores for the central dyads in the three cases are presented in Table 4-6.[11] The U.S.-Japan and Japan-U.S. pairs are the primary dyadic units of analysis for the Pearl Harbor case. An inspection of the raw score trends reveals that the United States was most hostile to Japan in the first three months of 1941; the scores from April to November of 1941 oscillated within a fairly narrow range -- from a maximum of 8.08 for the month preceding the attack to a low of -5.08 in September.[12]

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[11]Space limitations dictated an emphasis on the most relevant dyads (the U.S. and Japan and the U.S. and Germany for Pearl Harbor; the U.S. and the U.S.S.R. and the U.S. and China for Korea; the U.S. and Cuba and the U.S. and the U.S.S.R. for the missile crisis). Other pairs are of potential relevance from a monitoring or tracking perspective. Alliance dyads (such as the Axis powers in the World War II case and Cuba and the Soviet Union in 1961-1962) and potential alliance dyads (such as the U.S. and Britain from January of 1940 to the outbreak of war in late 1941) should be tracked. Snyder and Diesing (1977: 503) cite high interdependence among allies as one of five proximate reasons accounting for bargaining crises which eventuate in war. Dyads which are of limited interest from a "common sense" perspective may nevertheless be worth tracking for the clues which they provide; a particularly illuminating illustration of this point

Japan's behavior, in contrast, was decidely hostile. The October and November scores of -36.34 and -26.52 contrast sharply with the corresponding U.S. scores of 1.17 (reflecting a balanced mix of cooperative and conflictual events) and 8.07. At the same time, Germany's behavior toward the U.S. was even more negative in tone; the scores for the Germany-U.S. dyad for the three months of September, October, and November were -69.16, -42.60, and -38.09. The United States had not even sent an event to Germany since the conflict-saturated month of April (when the net score was -41.38).

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is the U.S.-Italy dyad in 1941. After April of 1941, the U.S. stopped directing messages and acts toward Germany; the U.S.-Japanese interactions were mixed in nature from August to November of 1941 (with monthly raw scores of 2.30, -5.08, .17, and 8.07); during the same period, U.S. events sent to Italy were decidedly conflictual in nature (with August to November raw scores of -10.40, -11.36, -9.55, and -7.34). In other words, the "crisis dyad" of the United States and Japan displays the expected configuration of complexity or "uncertainty" while the U.S.-Italy dyad is overtly conflictual (and the Italy-U.S. dyad is more blatantly hostile in terms of net scores for the same time frame). The dyads which do not appear in Table 4-6 are included in Appendix D; also, Table 4-9 presents data for the Axis allies.

[12]A simplistic interpretation of score patterns would have "predicted" a crisis escalation or an outbreak of war in April of 1941; the U.S. scores had "worsened" from January (-10.28) to February (-12.44) to March (-13.66). The April score, however, was a mild -1.47. The value of extended trend lines and the frequent covariation of high relative uncertainty and crisis behavior are both germane here. It should also be noted that U.S.-Japanese behavior was fairly accurately matched in the first five months of 1941; Japanese events directed to the U.S. were negative in June (a score of -6.31), became more negative in the next two months (scores of -18.08 and -11.29), and resumed the negative trend after the September "lull" (a score of 1.92).

The crisis is clearly signalled by an upsurge of events sent and received. In August, the U.S. sent 25 events to Japan (compared to 7 in the preceding month) while the Japanese sent 35 events to the U.S. (compared to 17 in July). The use of a simple volume indicator tends to "work" for dyads within a crisis arena as well as for the overall arena (cf. McClelland, 1972).

The Korean War case yields patterns which are more ambiguous than the Pearl Harbor configuration. While the number of events in the U.S.-Soviet dyad increased fairly dramatically from 4 in January of 1950 to 18 the next month and 22 in March, the simple volume indicator is less predictive in the period which immediately preceded the North Korean attack on South Korea. Some preliminary observations about events data and surprise attacks will be offered in the conclusion of this chapter.

The undiluted negativity in all four of the dyads in part B of Table 4-6 reflected the hostility which pervaded East-West relations at the height of the Cold War. The U.S.-China pair was characterized by overall negativity and a marked lack of communication; the U.S. sent 47 events to China over the entire 19-month period and China sent 72 events to the U.S.[13]

The results for the Cuban missile crisis case (see part C of Table 4-6) illustrate the empirical diversity of

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[13]The dyads for the Koreas do not contain sufficient data to establish any clear patterns; this applies to all 14 directed dyads involving North Korea, South Korea, the United States, the U.S.S.R., and China.

international crisis patterns.[14] While the events of October 1962 clearly constituted a "crisis" for both superpowers, the volume measure did not "predict" for the U.S.-Soviet dyad, although the Soviet Union increased its event total to the U.S. from 3 (August, 1962) to 17 (September, 1962); the Soviet raw scores for this two-month period were -1.65 and -19.22. During this two-month period, the U.S.-Soviet scores were .54 and -4.48. While Cuba played a peripheral role in the crisis decision-making process in Moscow and Washington, the Cuba-U.S. scores were significantly negative in July, August, and September of 1962. The score was -1.70 in June, -17.45 in July, -15.63 in August, and -17.00 in September.

4.4.2 Z-Scores: Unilateral and Dyadic Peak Periods. Peak periods are identified in terms of Z-scores. As in Sigler (1971: 109), we define months with Z-scores between +1.0 and -1.0 as routine or neutral; months greater than +1.0 are positive and those months which are less than -1.0 are negative. The unilateral peak months are highlighted in Table 4-7.

During the Pearl Harbor time frame, no conciliatory or accommodating months occurred for any of the four dyads profiled in Table 4-6 (U.S.-Japan; Japan-U.S.; U.S.-Germany; Germany-U.S.). For the U.S.-Japan dyad, December of 1941 was antagonistic. This was mirrored in the Japan-U.S. dyad for the same month. Japan was unfriendly toward the U.S. in October of 1941. While Japan was clearly "unfriendly" toward the U.S. during most of the 25 months, the October raw score was appreciably more negative than preceding monthly scores.

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[14] The April, 1961 scores reflect the abortive Bay of Pigs incident. For all four dyads, the raw scores for this particular month are the most negative of all 20 months. The raw scores and corresponding means are:

- U.S.-Cuba (-32.00; -3.56);
- Cuba-U.S. (-100.17; -16.45);
- U.S.-U.S.S.R. (-21.50; 1.77);
- U.S.S.R.-U.S. (-41.73; -4.88).

A. Friendship

Dyad	Month	Z-Score
Conciliatory		
U.S.- U.S.S.R.	MAY 1949	1.20
	SEP 1949	1.33
	NOV 1949	1.72
	DEC 1949	1.54
U.S.S.R.-U.S.	MAY 1949	1.24
	AUG 1949	1.06
	OCT 1949	1.05
U.S.-China	FEB 1949	1.12
	APR 1949	1.54
	MAY 1949	1.17
	SEP 1949	1.12
	DEC 1949	1.17
	MAY 1950	1.17
China-U.S.	JUN 1949	1.04
	NOV 1949	1.07
	MAY 1950	1.45
U.S.-Cuba	JUL 1961	1.04
	SEP 1961	1.09
Cuba-U.S.	JUN 1961	1.10
U.S.-U.S.S.R.	JAN 1962	1.64
U.S.S.R.-U.S.	JAN 1962	1.37
	NOV 1962	1.93
Accommodating		
U.S.-U.S.S.R.	NOV 1962	2.16

B. Hostility

Dyad	Month	Z-Score
Unfriendly		
Japan-U.S.	OCT 1941	-1.15
U.S.-Germany	MAY 1940	-1.21
Germany-U.S.	JAN 1941	-1.64
	OCT 1941	-1.37
	NOV 1941	-1.13
	DEC 1941	-1.33
U.S.-U.S.S.R.	OCT 1949	-1.07
	FEB 1950	-1.44
	APR 1950	-1.24
	JUL 1950	-1.39
U.S.-China	OCT 1949	-1.07
	JAN 1950	-1.19
	MAR 1950	-1.38
	APR 1950	-1.04
	JUN 1950	-1.54
China-U.S.	JAN 1950	-1.91
U.S.-Cuba	OCT 1962	-1.35
U.S.S.R.-U.S.	SEP 1962	-1.14
Antagonistic		
U.S.-Japan	DEC 1941	-4.56
Japan-U.S.	DEC 1941	-4.33
U.S.-Germany	APR 1941	-4.34
Germany-U.S.	SEP 1941	-2.76
U.S.S.R.-U.S.	MAR 1950	-2.14
	JUL 1950	-2.33
China-U.S.	MAR 1950	-2.02
U.S.-Cuba	APR 1961	-3.42
Cuba-U.S.	APR 1961	-3.63
U.S.-U.S.S.R.	APR 1961	-3.08
U.S.S.R.-U.S.	APR 1961	-2.92

PEAK PERIODS IN UNILATERAL ACTIONS

Table 4-7

The U.S.-Germany dyadic score was unfriendly in May of 1940 and antagonistic in April of 1941. While Germany did not respond in kind either month, the Germany-U.S. scores were unfriendly in four months in 1941 (January, October, November, and December) and antagonistic in one month (September). The popular hypothesis that war with Germany was more probable than war with Japan is given support in the peak score data in Table 4-7; Germany was unusually negative in its behavior toward the U.S. in five months in 1941.

The apparent failure of the United States to respond to negative acts on the part of Germany and Japan suggests that direct exchanges between states may not adequately depict pre-crisis periods. One pattern which is discernible during 1941 is the polarization of "friendly" relationships: the U.S., U.K., and U.S.S.R. increased triadic cooperation (especially during the latter half of the year) while Japan, Germany, and Italy grew closer (see also Appendix D). Our dyadic analysis cannot capture, except incompletely, such dynamics.

The Korean War dyads reveal several interesting pattern. Especially noteworthy is the presence of unusually positive interactions between the U.S. and the Soviet Union during the latter phase of 1949. The U.S. was conciliatory toward the Soviets in May, September, November, and December; the Soviets were conciliatory toward the U.S. in May, August, and October. The month of May qualifies as a detente phase in Sigler's (1971: 112) terminology.

These months of friendliness must be viewed in the context of Soviet-U.S. relations during the Cold War era. These were actually peaks of relative friendliness; all of the scores were negative or only mildly positive in actual magnitude (see Table 4-6). The same is applicable to the

U.S.-China and China-U.S. Z-scores. In fact, two of the six conciliatory months for the U.S.-China dyad were zero entries in Table 4-6.

The peak unfriendly months for the U.S.-Soviet dyad included October of 1949 and February, April, and July of 1950. The U.S.S.R. was antagonistic toward the U.S. in March and July of 1950.

The U.S. was unfriendly toward China in October of 1949 and January, March, April, and June of 1950. China reciprocated with unfriendly behavior in January of 1950 and was antagonistic in March. In relative terms, the U.S. and China simply did not act or interact on a frequent basis during the 19 months which comprise the Korean War case.

During the months which culminated in the Cuban missile crisis, the U.S. exhibited conciliatory behavior toward the Soviets in January of 1962 and the latter reciprocated. The first month of 1962 was therefore a period of detente in Soviet-American relations. Following the crisis, the Soviets displayed conciliatory behavior toward the U.S. (a raw score in November of 19.43) and the United States was accommodating toward the Soviet Union (a raw score of 15.25).

The Z-score results pinpoint September of 1962 as a negative month for the U.S.S.R.-U.S. dyad. The acrimonious impact of the Bay of Pigs incident is captured in the mutually antagonistic scores for April of 1961. The U.S. was conciliatory toward Cuba in July and September of 1961 while the Cubans were conciliatory toward the U.S. in June of 1961. The U.S.-Cuba dyad was unfriendly in October of 1962 and antagonistic in April of 1961; Cuba reciprocated in April of 1961. The latter month thus meets Sigler's (1971: 112) criterion for a crisis (mutual antagonism) for Cuba and the U.S. and for the Soviet Union and the U.S.

4.5 Conclusions and Implications

This preliminary overview of empirical patterns for three disparate crisis arenas yields results which are clearly mixed in nature. While the volume measure "tracked" the Pearl Harbor case accurately, the indicator was not as effective for signalling the outbreak of the Korean War or the Cuban missile crisis. The creative development of a diverse array of indicators is clearly warranted.

4.5.1 Problems and Relevance to EWAMS. Several problems surfaced in this exploratory mapping exercise. One of the most fundamental of these is the aggregation issue. Since we aggregated the dyadic data into monthly scores, we were unable to track event-interactions on a weekly or daily basis. This would have been especially advisable for the immediate pre-crisis period (i.e., November of 1941, May of 1949, and September of 1962). However, the frequent low monthly totals -- and the presence of a large number of zero entries for certain dyads -- demonstrate that aggregations below the level of the month would be even more problematic.

On the other hand, breakdowns below the monthly aggregation level are necessary in order to assess the impact of specific events. For example, Wohlstetter (1962: 71) refers to three periods of extreme tension in U.S.-Japanese relations prior to the attack on Pearl Harbor in December of 1941. The first, which occurred in June of 1940, was precipitated by the fall of France and the entry of Italy into the war. A flurry of official activity in Tokyo provoked a fear in the U.S. that preparations were being made for an attack on the Netherlands East Indies; there was also concern about a possible invasion of French Indochina. The second period occurred in late July 1941 in the context of the Japanese

ultimatum to the Vichy France regime demanding the right to use air and naval bases in Indochina (July 17). Eight days later, the U.S. announced its impending embargo on petroleum and cotton products.

Available signals pointed to a Japanese invasion of the Soviet Union; other possibilities included the seizure of bases in Southeast Asia and possible attacks against British and Dutch colonies. In the middle of October, 1941, a third extreme tension phase ensued after the fall of the Konoye cabinet in Tokyo. Signals at the time indicated the possibility of attacks directed at British and American possessions, although the primary focus of attention was an expected Japanese invasion of Siberia.

The strategy of collapsing discrete events into monthly units of analysis obviously precludes the direct scrutiny of the discrete components of dyadic exchanges. Each of the tension periods, for example, resulted in alerts in Hawaii: the June, 1940 events led to full alert status from June 17 to July 16; the U.S. embargo was accompanied by the imposition of alert measures by both the Army and Navy for several days; the fall of the Konoye government on October 15, 1941 was followed by warnings from Washington to Hawaii and alert status for the next few days.[15]

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[15]Interestingly, the warnings to the local forces in Hawaii in mid-October -- less than a month before the attack on Pearl Harbor -- caused attention to remain focused on the dangers emanating from local sabotage, not on the possibility of external attack. The former concern with sabotage continued to dominate expectations in Hawaii until the Japanese actually attacked. With reference to the warning and alert status in October, Wohlstetter (1962: 138) points out that a warning to a field commander is always read in terms of the specific local context.

The data for July of 1941 clearly show change from the previous month; according to Table 4-6, the U.S.-Japan scores were 1.28 (June) and -3.51 (July) while the Japan-U.S. scores were -6.31 (June) and -18.08 (July). However, it would be difficult to conduct an analysis of monthly data which would yield definitive results concerning, for example, the possibility of a pre-crisis peak in the data of July, 1941 and October-November, 1941. An additional example is the Japan-U.S. dyad in the several months preceding Pearl Harbor. The monthly net positivity score was 1.92 in September; the score shifted dramatically in October of 1941 to -36.34. Presumably, the undiluted negativity in the October score can be attributed to actions of the new government which replaced the relatively moderate Konoye regime on October 15; to produce definitive evidence, however, it would be necessary to disaggregate the data to the daily (or at least weekly) level.

Aside from the vexing aggregation issue, the limitations of the conflict-cooperation dichotomy should also be noted. The discussion of EWAMS work on pre-crisis peaks in the first section of this chapter illustrates the utility of moving beyond an emphasis on the gross categories of "conflict" and "cooperation." In addition to the verbal-physical distinction, it may also be productive to focus on specific categories (force, accuse, etc.) or combinations of categories. Subsequent work with both the EWAMS and the historical crisis data sets should experiment with different types of categories from information retrieval, monitoring, and warning perspectives.

A valid, reliable tracking or monitoring system would be one which has been employed in various temporal, dyadic, and systemic contexts. The disparate patterns for the three arenas which were scrutinized here suggest that few universal generalizations can be expected to apply across a heterogeneous sample of time frames or spatial contexts. Since "crisis" is a concept which tends to change in meaning over time as a function of

systemic transformations (see McClelland, 1977), the ideal of a system of context-free propositions may be illusory.

Tracking systems may consequently be as numerous as identifiable spatial/temporal parameters. The set of indicators which may have "worked" in the interstate system of the 1930's and early 1940's may differ significantly from the set which tracked successfully at the height of the Cold War. The less rigid system of the 1970's may require another set of indicators.

The work on EWAMS "Global" P-tables is based on 27 crises for the period between 1966 and 1975.[16] Table 4-8 provides the file of all crisis cases. The probability program will soon be updated by adding crises which have occurred since 1975 and by basing P-tables on the most reliable version of WEIS. Additionally, as an alternative to calculating Z-scores progressively since 1966, the utility of employing 30-, 60-, and 90-day tails will be explored. This will enhance the flexibility of the probability-calculation component of the system and enable users to choose from a menu of options.

One of the most obvious manifestations of the impact of varying parameters involves the probable differences which characterize subsystems of the international system. Work on a region-specific algorithm and threshold for the Middle East provides preliminary evidence for the validity of this hypothesis.[17] Unweighted and weighted tension socres were calculated over various combinations of fourteen Middle East crises. Generally, the results suggest that a region-specific tension algorithm -- tension weighted by $1/f^2$ rather than $1/f$ -- is

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[16]For details, see Daly and Bell (1977b) and Daly and Davies (1978: 106-123).

[17]The Middle East case study results are presented in Daly (1977a), Daly and Bell (1977a), and Daly and Davies (1978: 86-90).

1	2	3	4	5	6	7
jor	syr	6601	6612	6611	6612	6612
jor	plo	6601	6612	6611	6612	6612
jor	isr	6701	6712	6705	6706	6706
jor	isr	6709	6808	6712	6801	6803
jor	syr	7001	7012	7008	7009	7009
jor	plo	7001	7012	7008	7009	7009
usr	chn	6608	6707	6612	6701	6702
usr	cze	6801	6812	6807	6808	6808
usr	chn	6901	6912	6902	6903	6903
usr	usa	7001	7012	7008	7009	7009
usr	usa	7301	7312	7309	7310	7310
isr	syr	6701	6712	6705	6706	6706
isr	uar	6701	6712	6705	6706	6706
isr	uar	6901	6912	6901	6902	6903
isr	syr	6901	6912	6901	6902	6903
isr	syr	7001	7012	7008	7009	7009
isr	uar	7301	7312	7309	7310	7310
isr	syr	7301	7312	7309	7310	7310
grc	tur	6701	6712	6710	6711	6711
grc	tur	7401	7412	7406	7407	7407
tur	cyp	6701	6712	6710	6711	6711
tur	cyp	7401	7412	7406	7407	7407
usa	kon	6708	6807	6712	6801	6802
usa	syr	7001	7012	7008	7009	7009
ind	pak	7106	7205	7110	7111	7112

Format:

1. Initiator
2. Recipient
3. Beginning yr. of crisis - Date
4. End of crisis year - Date
5. Pre-crisis month - Date
6. Beginning month of crisis - Date
7. Last month of crisis - Date

FILE OF ALL CRISIS CASES

Table 4-8

the most reliable and valid algorithm for this particular region. For that weight, 75 is the most useful warning threshold.[18] The obvious next step is to conduct a series of cross-regional comparisons; the initial candidate for development will probably be the African subsystem.

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[18]For the 1/f weighted tension algorithm, a warning threshold of 70 has the highest association with historical reality. The standard algorithm is calculated as follows:

$$\frac{\text{CONFLICTUAL BEHAVIOR (CON)}}{\text{DENOUNCE}\\ \text{ACCUSE}\\ \text{THREATEN}\ldots}$$

$$\text{TENSION} = \left[\frac{\text{CON}}{\text{TOT}} - \frac{\text{CON}}{\text{TOT}^2}\right] \times 100$$

Or, more simply:

$$\text{TENSION} = \frac{\text{CON}}{\text{TOT}}\left[1 - \frac{1}{\text{TOT}}\right] \times 100$$

The Middle East algorithm is:

$$\text{TENSION} = \left(\frac{\text{CON}}{\text{TOT}} - \frac{\text{CON}}{\text{TOT}^3}\right) \times 100$$

The historical crisis data sets may be tested in order to provide additional empirical evidence about crisis probabilities and patterns and to supplement the extensive current and envisioned EWAMS research.[19] While the data are retrospective and therefore do not contribute to the vital task of real-time monitoring and warning analyses, the data sets enrich the contemporary WEIS data base by extending the spatial parameters and thereby facilitate the use of history as a "laboratory" for testing hypotheses and developing indicators. The future applications of the historical data sets are potentially infinite; three specific foci will be highlighted below:

- The systematic analysis and attempted validation of historical interpretations;
- The testing of crisis models;
- The elaboration of a theory of surprise.

4.5.2 Future Applications. Historical interpretations of the processes which culminated in the Japanese attack on Pearl Harbor display extreme diversity.[20] The revisionist school, exemplified by Beard (1948) and Tansill (1952), charges that the United States intentionally provoked Japan into attacking the U.S. At the least, according to the Back Door to War interpretation (Tansill, 1952), President Roosevelt maneuvered Japan into attacking and thereby achieved his putative primary

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[19] Research conducted under the supervision of Dr. James Robbins of the Central Intelligence Agency has examined the pre-crisis peak phenomenon in the historical crisis data sets. As is the case with all CTO-supported research, the data have been deposited at the DDF and are thus available to all Crisis Management Program contractors.

[20] The literature on this subject is voluminous; the discussion here relies on Ben-Zvi (1975) and Hosoya (1968).

goal of entering the European War through the "back door."[21] The revisionist literature can be juxtaposed against the pro-administration school (e.g., Feis, 1950), which maintains that the U.S. government simply responded to the provocations of an aggressive opponent. The two viewpoints correspond to the competing contrast-models which revolve around the spiral and deterrence concepts.

Briefly, the deterrence theory posits that there are great dangers if the aggressor believes that the status quo powers are weak in capability or resolve.[22] The spiral model views the international system from a Hobbesian perspective; in an anarchic world, most means of self-protection simultaneously menace others. The deterrence or Chicken theory and the spiral or Prisoner's Dilemma model are mutually exclusive theories.

Advocates of the revisionist posture are simultaneously proponents of the spiral or self-fulfulling prophecy model; mutual misperception and the inexorable effect of unintended (and undesired) consequences of actions designed to be defensive led to the outbreak of war between Japan and the U.S. The pro-administration position reflects the prescriptions (and predictions) of deterrence theory; what was at stake, according to the defenders of the "Munich" image of Japan, was not a set of specific issues (economic relations, China, etc.) but the fundamental question of American security.

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[21]Some interpretations exonerate Roosevelt (e.g., Ben-Zvi [1975: 235] classifies Roosevelt with Ambassador Grew as a cautious "nationalist-pragmatist") whereas other analyses shift the focus (and blame) from the President to another actor or group of actors, such as Secretary of State Hull (see, e.g., Hosoya, 1968: 97).

[22]This paragraph is based on Jervis (1976: ch. 3).

In a pure spiral pattern, events exchanged by a dyad would consist of action-reaction sequences which were punctuated by episodic escalations to total war; alternatively, in an exaggerated deterrence situation, the status quo power's cooperative overtures would be met with hostility (or exploitation) while forceful signals and actions could possibly intimidate the potential aggressor (assuming a relatively rational opponent) and compel him to back down.

Quantitative events data can never definitively resolve the "great debates" which animate discourse among historians. In any case, a direct test of the conflicting hypotheses is impossible; events data rarely reveal the internal processes which precede and eventually culminate in a formal decision. Ben-Zvi's (1975) analysis demonstrates that the course of U.S.-Japanese relations in 1940 and 1941 reflected the pulling and hauling <u>within</u> the U.S. government.[23]

Three distinct groups can be identified: the global-realists such as Secretary of War Stimson; the global-idealists such as Secretary of State Hull; and the nationalist-pragmatists, who were typified by Ambassador Joseph Grew. The first group consisted of hard liners who perceived a crisis of global proportions which reflected orchestrated attacks by Japan and the other revisionist members of the Tripartite Pact. The globalist-idealists saw Japan as an aggressor which refused to work within the framework of collective security and international law. The members of the nationalist-pragmatist faction emphasized national interests and were both cautious and flexible in outlook.

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[23]See also Hosoya (1968) on the hard line and soft line factions. As Hosoya (1968) notes at various points, the Japanese government was also divided on a number of key issues. On this case in particular and the relationship between interstate crisis bargaining and intrastate bureaucratic politics in general, see Snyder and Diesing (1977: ch. 5).

While direct tests of pertinent aspects of the internal process of decision-making are obviously impossible, certain hypotheses deduced from the hard line and soft line camps are susceptible to analysis. One of the most prominent of these is the globalist view of the Axis "conspiracy" versus the competing nationalist-pragmatist position:

> The nationalist-pragmatists recognized that Japanese policies responded to the developments in the European theater, but they did not view them as part of a global scheme planned by the triumvirate of Germany, Italy, and Japan for the purpose of challenging the democracies and conquering the world. Thus, the army projected a picture of Japan's relations with its Axis allies that was much more dynamic, multifaceted, complicated, and open to changes than the ones crystallized by [such globalist/hard liners as Secretary of the Treasury] Stimson, and [political advisor to the State Department Stanley K.] Hornbeck, whose image of Japan was undifferentiated and inseparable from that of its Axis partners. The nationalist-pragmatists were able to recognize the various factors which strained Japanese-German relations, and thus the army recommended certain broad policies designed to deepen Japanese-German cleavages [Ben-Zvi, 1975: 238-239].

By tracking relations between the members of the various dyads (the U.S., Japan, Germany, and Italy), it may be possible to obtain suggestive evidence for or against the nationalist-pragmatist belief in the fluidity of intra-Axis and Japanese-U.S. relations in the interim between the signing of the Tripartite Pact in September of 1940 and the Pearl Harbor attack 14 months later. General patterns (high or low volume and variety), specific trends (variations in types of intra-alliance and U.S.-Japan conflict and/or cooperation events), and evidence of "normality" or deviation should all be monitored. To the extent that it is feasible, daily (or weekly) intervals should be examined.

Salient historical breakpoints in Europe and the Pacific should receive special attention. Among these are:

- March 30, 1940 (establishment of a puppet Chinese government at Nanking with Japanese support);
- June, 1940 (the fall of France);
- July 16, 1940 (Prince Fumumaro Konoye, the new Japanese prime minister, assumes power in order to carry out a program of "national consolidation and defense");
- September 22, 1940 (Japanese forces begin occupying French Indochina);
- September 27, 1940 (Three-Power Pact -- Germany, Italy, Japan);
- June 22, 1941 (German invasion of the Soviet Union);
- June 23, 1941 (Vichy France announces that it has granted Japan's demand for military control of Indochina);
- October 17, 1941 (General Tojo becomes Premier and Minister of War of Japan).

Perhaps the most interesting single comparison would involve the fall of France in June of 1940 and the German invasion of Russia in June of 1941. The former event provided Japan with the opportunity for extending its influence to the Indochinese peninsula. In sharp contrast, the attack on the Soviet Union caused both surprise and anger in Tokyo (Ben-Zvi, 1975: 240) and is only the most salient of a number of strains and misunderstandings in prewar German-Japanese relations. Table 4-9, which presents data from Appendix D, supports the soft line viewpoint that Axis relations were far from the globalist image of consciously coordinated aggressors. The data -- or, more accurately, the lack of data -- support the inference reported in Ben-Zvi (1975: 240-241) that the "alliance" was more a fortuitous conjunction than a conspiracy and that Japan and its Axis partners pursued independent and frequently incompatible goals both before and after the consummation of the pact in September of 1940.

Month	Italy-Germany	#	Ger.-Italy	#	Ger.-Japan	#	Japan-Germany	#	Japan-Italy	#	Italy-Japan	#
JAN 40	2.94	1	.42	5	0	0	0	0	0	0	0	0
FEB 40	0	0	0	0	1.24	1	0	0	0	0	0	0
MAR 40	14.55	5	14.55	5	0	0	0	0	0	0	0	0
APR 40	5.03	2	0	0	0	0	0	0	0	0	0	0
MAY 40	7.54	3	4.63	2	0	0	0	0	6.10	3	0	0
JUN 40	14.55	5	14.28	5	0	0	0	0	2.94	1	0	0
JUL 40	0	0	8.40	3	1.27	2	0	0	0	0	0	0
AUG 40	0	0	0	0	0	0	0	0	0	0	.11	1
SEP 40	0	0	2.78	1	0	0	0	0	.11	1	0	0
OCT 40	24.45	9	24.23	9	3.43	3	2.78	1	2.51	1	.65	2
NOV 40	5.88	2	6.90	3	5.03	2	2.94	1	0	0	2.51	1
DEC 40	0	0	8.25	4	8.66	3	0	0	2.78	1	2.78	1
JAN 41	7.34	3	17.33	7	6.92	3	11.51	5	0	0	0	0
FEB 41	15.19	7	14.06	5	8.79	6	2.94	1	0	0	0	0
MAR 41	0	0	7.79	3	11.34	4	14.28	5	2.94	1	2.51	1
APR 41	3.05	2	5.56	3	8.77	4	0	0	14.50	7	8.83	3
MAY 41	0	0	5.88	2	5.88	2	0	0	5.88	2	5.88	2
JUN 41	0	0	5.72	2	2.51	1	0	0	2.51	1	1.24	1
JUL 41	0	0	2.94	1	3.86	3	0	0	0	0	.11	1
AUG 41	0	0	6.47	3	0	0	0	0	0	0	.11	1
SEP 41	0	0	4.18	2	6.58	5	0	0	10.06	4	0	0
OCT 41	0	0	27.20	14	.61	6	0	0	2.57	1	2.62	2
NOV 41	0	0	10.70	5	11.17	6	0	0	8.07	3	8.18	4
DEC 41	0	0	17.28	7	31.56	12	0	0	9.31	4	13.64	6
JAN 42	0	0	11.02	4	8.29	5	0	0	5.56	2	6.58	3
Sum	100.53	41	217.76	95	125.92	68	51.30	13	75.85	32	55.75	29
Mean	4.02		8.83		5.04		1.83		3.38		2.23	
S. D.	6.57		7.27		6.77		4.10		4.08		3.62	

MONTHLY FREQUENCIES AND NET POSITIVITY SCORES: AXIS DYADS

Table 4-9

This interpretation is tentative, given the potential problems with the data as well as other relevant factors.[24] The descriptive pattern in Table 4-9 is used here as an illustration of potential applications of the data rather than as a definitive test of the soft line hypothesis about the fragility of the Axis partnership. Obviously, further work is necessary on this specific issue and on other hypotheses culled from the literature on the globalist and soft line schools in the 1940-1941 period.

For all of the cases in the historical data sets, a variety of models of crisis dynamics and behavior could be constructed and tested. Two specific examples will be mentioned here. One is the action-reaction syndrome, a model which has attracted a considerable amount of attention in both

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[24]The New York Times may have underreported two-way dyadic events for Germany-Japan as well as for the two other dyads (Germany-Italy and Japan-Italy), since the focus of attention prior to Pearl Harbor was the situation in Europe and the Atlantic. This relative allocation of emphasis even characterized the intelligence evaluation and warning process in the U.S. government (see Wohlstetter, 1962: 3, 79, 90, 230, 278, 387). For example, in June of 1940, there were fears about a possible Japanese attack on the Netherlands East Indies or elsewhere and/or a joint Japanese-Soviet operation to detain U.S. ships in the Pacific; simultaneously, however, the events in Europe (the collapse of France, the entry of Italy into the war, and the possible fall of Britain) and concerns about possible German sabotage of the Panama Canal and the danger posed to Brazil and Uruguay all dominated the warning and decision processes (see Wohlstetter, 1962: 74-90). Aside from possible source biases, it is unlikely that "misunderstandings" between Japan and Germany would have appeared in the public media; cable traffic analyses would be a useful supplement in efforts to chart strains within an alliance involving two closed regimes. To the extent that such source omissions and limitations are operating, the zero entries in Table 4-9 are of course very misleading. However, Japan-Germany and Japan-Italy interactions were undoubtedly infrequent both absolutely and relatively (i.e., compared to such alliance partners as Italy and Germany or the Soviet Union and Britain after the Nazi invasion of the former).

theoretical and empirical work.[25]

A crude stimulus-response or action-reaction analogy suggests that two states will simply respond in kind to each other; but, as Phillips (1978: 162) points out, international relations is certainly more complex than a tennis match. The reality of uncertainty, in fact, is a pervasive feature of interstate interactions. A does not simply respond in a passive, symmetrical fashion to B.

A variety of action-reaction models employing different time lag and decaying memory assumptions should be tested in the context of the Pearl Harbor and other cases. Two central questions can be considered. First, when does a state's own prior behavior (bureaucratic inertia) prevail over reciprocity processes (Phillips, 1978)? Second, what are the factors which account for exceptions to the stimulus-response dynamic? These could range from total deception and surprise (e.g., Barbarossa) to the intrusion of exogenous factors (a change in regime, a shift in the balance of power within the ruling coalition, preoccupation with competing external stimuli, the mobilization of dormant domestic forces, etc.).

The second example concerns the identification of phases in a crisis. The a priori specification of phases or stages has been the source of extensive research on conflicts and crises; empirical work in this area has been relatively rare.[26] A noteworthy exception is Chan's (1978) recent study.

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[25]The action-reaction model will be discussed in detail later in this Report; the best recent account is Phillips (1978).

[26]Typologies of crisis phases are discussed below; see pp. 191-193.

Chan applies the Poisson probability method to measure changes in U.S. behavior during the early years of the Vietnam War. As Chan (1978: 239) points out, it is misleading to assume temporal coincidence in the beginning and duration of conflict situations for all of the participants. Nor does it make sense to equate stages or phases with such standard time units as weeks or months.

The Poisson method is ideally suited for events data analysis. As Chan (1978: 243) notes, Poisson-based event comparisons can deal effectively with low event frequencies, are capable of handling the problem of zero-value entries in data time series, do not impose the stricture that the data be random samples, and provide equivalent measures of change across a wide range of relative event frequencies.[27] Chan concludes:

> The Poisson method provides a useful tool for checking our quantitative understanding of history. It enables us to pinpoint and measure more precisely the turning points in conflict development on the basis of which we may partition this development into meaningful phases or stages...the specific timing of these changes in U.S. behavior [toward North Vietnam and the National Liberation Front], the magnitude of their departure from previous behavior, and the duration that they were sustained are often significantly different for the two communist targets. Therefore, to the extent that we value sensitivity and precision in our analysis, we ought to avoid assuming temporal coincidence of conflict phases for members of an international coalition [78: 262-263].

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[27] Two criteria for conformity to a Poisson-distribution pattern are violated in events data sets: the incidents are presumed to be homogeneous and each incident is statistically independent. Chan (1978) meets the event-homogeneity assumption by restricting his focus to force or military attack events. The latter criterion is more problematic; however, if the other conditions are fulfilled, the deviation from the theoretically expected distribution can be attributed to the failure to meet the random distribution condition.

The general relevance of the method to events data bases and its special applicability to the study of coalitions (e.g., Pearl Harbor) and third parties (e.g., the Cuban missile crisis and the Korean War) both point to the potential value of analyzing the crisis cases with the Poisson method.

A third possible focus of the data sets described in this chapter concerns the subject of warning, intelligence, and surprise. The Japanese attack on Pearl Harbor, Barbarossa (the Nazi attack on the Soviet Union), the North Korean attack on South Korea, and the Cuban missile crisis are all instances which were characterized by the aggressor's effective use of surprise; each has been examined from the case study perspective.[28] The literature on intelligence failures and surprise attacks is voluminous.[29] Although surprise is no longer considered to be one of the defining attributes of crisis per se,[30] the dangers of deception and surprise are omnipresent in international affairs. We cannot escape the fact of uncertainty, as Wohlstetter (1962: 401) concludes in her masterful study.

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[28]On Pearl Harbor, see Wohlstetter (1962); Whaley (1973) focuses on Barbarossa; see DeWeerd (1962) on the Korean War; Knorr (1964) discusses the Cuban missile crisis; Wohlstetter (1965) compares Pearl Harbor and Cuba. In a study which articulates a framework for the analysis of surprise attacks, Ben-Zvi (1976) discusses two of the cases (Barbarossa and Pearl Harbor) as well as the Chinese intervention in the Korean War, the Sino-Indian border war of 1962, and the Arab-Israeli War of 1973.

[29]In addition to the works cited in the preceding footnote, see Bell (1974), Brecher (1977a), Handel (1977), and Shlaim (1976) on the Yom Kippur War and Holst (1966) on the German attack on Norway. Also relevant are the sources cited in Ben-Zvi (1977). See also Wasserman (1960). The conceptual and theoretical literature is sparse; Ben-Zvi (1976) and Handel (1977) are noteworthy exceptions.

[30]See pp. 181-184 for a discussion of conceptual work on crisis and the status of surprise as a criterion.

It is highly unlikely that events data will provide unambiguous signals or patterns with respect to surprise attacks. This is especially pertinent to instances of deception "pure and simple" (e.g., Barbarossa) when no real warning signals are provided.[31] However, in other cases, the potential surprise attacker may emit relevant signals. Such signals are almost invariably "muffled" by noise; in the case of Pearl Harbor, for example, the failure to anticipate the attack reflected the plethora of irrelevant stimuli, not the absence of relevant stimuli (Wohlstetter, 1962: 387). To the limited extent that events data monitoring can be expected to provide early warning (if at all), only cases of attacks which are preceded by a buildup of hostility (e.g., Pearl Harbor, the Korean War) would be "explainable."[32] Furthermore, nothing in the overt content of the data would necessarily provide early warning; only certain patterns -- analytically-derived configurations about which decision-makers would have no awareness -- could conceivably forecast a probable attack.

Given our repeated failure to profit from past work on surprise attacks and the theory of surprise (Handel, 1977), striking breakthroughs cannot be expected. The evaluation of intelligence data and the warning process are exceptionally delicate tasks; competing signals (as for the U.S. in 1940-41), noise, bureaucratic politics factors, and belief system constraints all complicate the effort. The systematic analysis of objective data is therefore offered as a potentially useful supplement to expert judgment, not as a panacea (or a nostrum).

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[31] In the Barbarossa case, Stalin's adamant refusal to believe that Hitler would not launch an attack without initially presenting an ultimatum compounded the problem. This exemplifies what Handel (1977: 551-552) calls "self-generated noise."

[32] In the case of Pearl Harbor, for example, the government was certainly expectant -- but expected wrong (Wohlstetter, 1962: vii).

The indicator system which we have employed in a very crude fashion in this chapter was limited to events data. The development of multi-tiered tracking or indicator systems is clearly required. In addition to the question "who does what to whom?," we should focus on a wide range of static attributes and dynamic determinants. The eventual goal of an integrated crisis warning system presupposes the collection and merging of diverse data sets.

5.0 THEORY-CONSTRUCTION IN INTERNATIONAL CRISIS ANALYSIS[1]

The "explosion" in crisis analysis output has been documented convincingly in the preceding four chapters. Especially in the area of data collection, progress has been impressive. Additionally, dozens of specific hypotheses have been tested. Conceptual work has also been prolific -- as this chapter will demonstrate.

In striking contrast is the state of theory in crisis analysis. Given a rigorous definition of theory, the conclusion that there are no genuine theories of crisis is inescapable. This generalization applies to both of the identifiable subfields of crisis inquiry -- crisis warning and crisis management.[2] Furthermore, no amount of technological wizardry or methodological sophistication can compensate for the absence of a genuine theory of crisis. As Zinnes points out in her assessment of the problem of cumulation in the general field of Quantitative International Politics, genuine explanation cannot be achieved through "additive cumulation" (or the process of simply amassing larger amounts of information and continuing to generate reams of ad hoc hypotheses and correlation analyses):

> ...we cannot achieve explanation through induction. At some point someone must make the leap and propose an explanation. While the accumulated facts may be highly suggestive of the broad

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[1]This chapter is primarily a revised version of Hopple and Rossa (1978c).

[2]On crisis warning, see Andriole (1976), Andriole and Young (1977), Belden (1977), McClelland (1977), McClelland et al.(1965), Moore and Young (1969), and Rubin (1965). Crisis management is the focus of Bell (1971), Bloomfield and Beattie (1971), Candela (1974), Kupperman et al. (1975), Milburn (1972), Shapiro and Cummings (1976), Shapiro and Gilbert (1975), Tanter (1975), and Williams (1976). On both subjects in general, see Parker's (1977a) bibliographic essay.

> outlines of that explanation, it takes a human mind to make that final jump, to assemble the pieces into a meaningful explanation. Pieces do not assemble themselves [Zinnes, 1976: 163; emphasis in the original].

The substitution of statistics, computers, and data collection activities for explicit, creative theory construction simply does not suffice.[3]

5.1 Overview

Like power, democracy, crisis, and a plethora of other terms in the political scientist's conceptual armamentarium, theory has been saddled with a potpourri of definitions and has been subjected to a dangerous amount of conceptual stretching. Our definition of theory will be precise; we will subsequently offer the judgments that current work in crisis analysis may provide the foundation for theory-building and that a number of non-theoretical activities which are valuable in and of themselves are being pursued by crisis researchers.

Rapoport's (1958) classic discussion of the multiple meanings of "theory" illustrates the range of definitions which has been attached to the concept; more extensive definitional inventories could easily be compiled. A reasonably delimited definition of the term scientific theory would equate the latter with an intrinsically abstract, formal, simple, and rigorous system of statements. Representative examples of definitions from three international relations scholars are presented below.

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[3]The literature on theory-building versus inductive inquiry is extraordinarily voluminous; see especially Hopple and Conway (1978), Job and Ostrom (1976), and the following section of this chapter.

By theory, we refer to a system of internally consistent statements which allow us to explain or predict deductively. The core elements in a theory consists of three kinds of statements: definitions, assumptions, and scope conditions. Definitions assign meaning to our key terms (concepts)....Our definitions should be context free, i.e., ahistorical....Assumptions state "if...then" relationships between concepts, e.g., if some members of a group are relatively under-rewarded, they try to achieve the same rewards as other members of a group. Scope conditions state the necessary characteristics of situations or actors for the assumptions to hold....A theory then is a system of statements which include concepts and relationships....Since theory is a system of statements, we do not test it by testing any one statement in that system. A meaningful test involves checking some statement which is the joint product of at least two elements (assumptions and/or scope conditions) of that system [Bobrow, 1972: 210].

A theory is a set of general statements such that: (1) some of the statements (the assumptions or premises) logically imply the others (the theorems), and (2) the theorems can be cast in the form of falsifiable predictive statements about the real world [O. Young, 1972: 180].

Statements are basic units of theory, and we ought to be able to classify statements with regard to their formal properties. The first property is the empirical applicability of the concepts in the statement. We have three choices:

1. Statements in which all concepts are empirically indexed are called <u>empirical</u> statements.
2. Statements in which some of the concepts, but not all, have an empirical referent are termed <u>semantical</u> statements.
3. Statements whose concepts have no empirical reference are <u>syntactical</u>.

...Another formal property of statements is their logical order. They may be either <u>primary</u> statements in that they are not derived from any other statements in the theory, or they may be <u>derived</u> statements - the formally reduced conclusion of one or more statements [Phillips, 1974: 164; emphasis in the original].

The three definitions converge in an emphasis on theory as a system of propositions in which assumptions or premises (primary statements) constitute the source of theorems or derived statements (i.e., the interconnections are deductive in nature). This constitutes the scope of theoretical research activity. Very little of this activity occurs in political science.[4]

In the realm of crisis analysis and in various other subfields of political science, a considerable amount of quasi-theoretical (and pre-theoretical) research activity is conducted. Among these activities are conceptual delinea-

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[4]In the subfield of international relations, O. Young (1972: 184) cites only two completely exemplary cases: the construction of formal models of arms races and game theory. As he emphasizes, these efforts do not "stand up well in terms of the criteria of evaluation" such as parsimony and "heuristic fruitfulness" (Young, 1972: 183). In the general field of political science, there has been considerable interest in the transferability of simple, logically rigorous, abstract mathematical models as a foundation for deductive theoretical research activity. The most obvious manifestation is the voluminous literature on rational choice models of voting and other forms of political decision-making behavior (see Riker and Ordeshook, 1973 and Rogowski, 1978; for a critique of this literature, see Almond and Genco, 1977: 508-509). The most "theoretically" and methodologically sophisticated subfield in the discipline is the study of American voting behavior; it may therefore be instructive to cite an assessment of the status of theory in that area of inquiry:

> A brief word about "theory" is necessary. We did not expect to find, nor did we find, a theory of elections in the work reviewed here. What we do find are theoretical statements about electoral outcomes, about voter choice, about the composition of the electorate, and so forth....We do believe, as we judge the SRC [Survey Research Center] group to believe, that an attempt to establish a theory of elections in the United States is premature. Not enough cases have been systematically studied [Prewitt and Nie, 1976: 36].

tion and specification processes and the development and refinement of "theoretical" research questions.[5] The latter constitute the precursors of the premises and theorems of a theoretical statement system.

In the context of this assessment of crisis analysis and theory, everything else is assigned to the sphere of non-theoretical research activity. Among these variegated research tasks are applied inquiry and methodology and substantive research. Applied inquiry has a problem-solving focus and may have a theoretical or non-theoretical basis.[6] Methodology

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[5]Considerable controversy exists about which research questions are properly conceived of as "quasi-theoretical" in nature. A set of such research questions can be viewed as a framework or "perspective" which might be developed into a theory of crisis behavior or some other type of political behavior. Bobrow (1972: 211-215) evaluates five research perspectives in order to illuminate the gaps between the perspectives and the ideal image of theory construction; Phillips (1974) employs field theory, rank theory, the arms race model, and utility/conflict of interest theory in his discussion of embryonic "theories" in scientific international relations.

[6]Applied inquiry is research which focuses on current problems or decision-making processes and is explicitly designed to ameliorate or solve the problem or improve the performance of information-processing, choice, and appraisal tasks. Hermann (1975: 29) notes that Alexander George has advocated that basic research be evaluated for its contribution to "two types" of "policy-relevant theory:" substantive theory or process theory. Applied research, then, may focus on a problem or issue area or on the more generic decision-making process. A genuine theory of political behavior could spawn a theoretically-based field of applied politics; alternatively, applied research can be (and has been) conducted in the absence of anything approaching a theory. For illustrative and diverse examples, see Andriole and Young (1977), Candela (1974), George et al. (1971), and Hazlewood et al. (1977). Given this definition of applied research as inquiry which is explicitly designed to assess and improve current policy-making from substantive and/or procedural vantage points, two generalizations should be noted. First, much of what is labelled "policy research" is not at all applied. Secondly, the phrase "applied research" subsumes a vast array of disparate approaches, including theoretically-

concerns the development, refinement, and application of techniques for acquiring and analyzing data. Substantive research deals with real world phenomena and ranges from detailed case studies to cross-national research.[7]

None of these research activities should be denigrated. All of them may contribute to the eventual development of a genuine theory or theories (assuming that theories are possible in the field of political analysis and recognizing that the contributions of these non-theoretical activities will be decidedly indirect and diffuse). Each activity is of value even if it contributes nothing immediate to the articulation or refinement of theory.

Theory building, then, is not sacrosant. Nor, given the precise definition above, is it necessarily attainable. While this realization does not warrant an abandonment of the quest for theory, it does suggest that non-theoretical research activities are both valuable and legitimate. Viewed from a slightly different perspective, in fact, a considerable amount of non-theoretical research becomes quasi-theoretical. The focus here will be on conceptual developments and on pre-theoretical and/or quasi-theoretical propositional-generation and testing. Five distinct quasi-theoretical questions can be posed.

- What is a crisis?
- What possible developments lead to a crisis (i.e., how is it possible to avoid or recognize an impending crisis)?

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based/non-theoretical, traditional/scientific, qualitative/statistical/mathematical, case-oriented/comparative, and empirical/normative/prescriptive (to provide a partial list).

[7]Substantive research may be applied or basic and is as disparate as applied research.

- What behavioral patterns occur during a crisis?
- What developments characterize the crisis resolution or abatement process?
- What are the consequences of a crisis?

Each of these questions will be discussed below. It should be noted at this point that the search for a valid definition of international crisis is the prerequisite for sustained progress in both empirical research and theoretical activity. Crisis -- or crisis behavior -- is the obvious dependent variable in any schema, framework, model, or theory which purports to describe, explain, and predict the occurrence of crises (crisis warning or anticipation) or the decision-making processes which transpire after a crisis has been perceived (crisis management).

5.2 The Conceptual Labyrinth[8]

We are intentionally anchoring the concept crisis in an international relations disciplinary matrix, although it could be argued that crisis is a generic political phenomenon and could be analyzed in domestic political and international political contexts. In fact, the nature of the nexus between intranational and "foreign" or international crises is a research question which has attracted considerable

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[8]This section is based on the numerous discussions of crisis as a concept; the seminal works here are Hermann (1969b) and McClelland (1961). Crisis definitions are reviewed in Bell (1971: 6-15), Edwards (1969), Hermann (1969a: 21-24; 1972b: 6-16), Moore et al. (1975: 2-13), Robinson (1962, 1968, 1970: 111-116, 1972: 20-27), Tanter (1975), and Williams (1976: 10-27). The range of specific conceptual and operational definitions is illustrated by the following works: Brecher (1977c: 43-44); Halper (1977: 111); Hazlewood et al. (1977: 79); Kahn (1965); Moore et al. (1975: 19); North et al. (1963: 4); Phillips and Hainline (1972: 6); Triska and Finlay (1968: 317); O. Young (1967: 10; 1968: 15).

interest.[9] The universality of power, coalitions, negotiation, bargaining, decision-making, and other phenomena and processes suggests that many of the concepts which serve as reference points in international political analysis and foreign policy research should be analyzed simultaneously in intranational and international subfields of inquiry. However, we will restrict our focus to research on international and foreign policy crises, since prevailing subfield boundaries have not been abolished and there is a discernible research community which concerns itself with international relations/crisis.

Simple frequency of usage and the conceptual imprecision which plagues all of the behavioral sciences account for a considerable proportion of the prevailing terminological confusion. McClelland captures the essence of the first factor:

> Almost everyone who has studied the topic of international crises recently has had to struggle with the problem of identification. What, really, is an international crisis and how may it be distinguishable from non-crisis instances of rivalry, clash, confrontation, and danger involving two or more national states? So many studies of crisis have been published in the last fifteen years from so many different angles of inquiry that it is more difficult than it once was to be sure about the denotations and connotations of the term. Not only is there a heavy popular usage of the word in ordinary discourse but also there are indications that historical change has brought about an expansion of the variety of situations that are called readily by the crisis name [1975a: 1].

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[9] The interest has been primarily speculative in nature. Aside from the research on the domestic and foreign conflict linkage, almost no cross-national, empirical research has dealt with the nexus between internal and external crises; see section 6.1.2 (p. 229) for a summary of the major research efforts.

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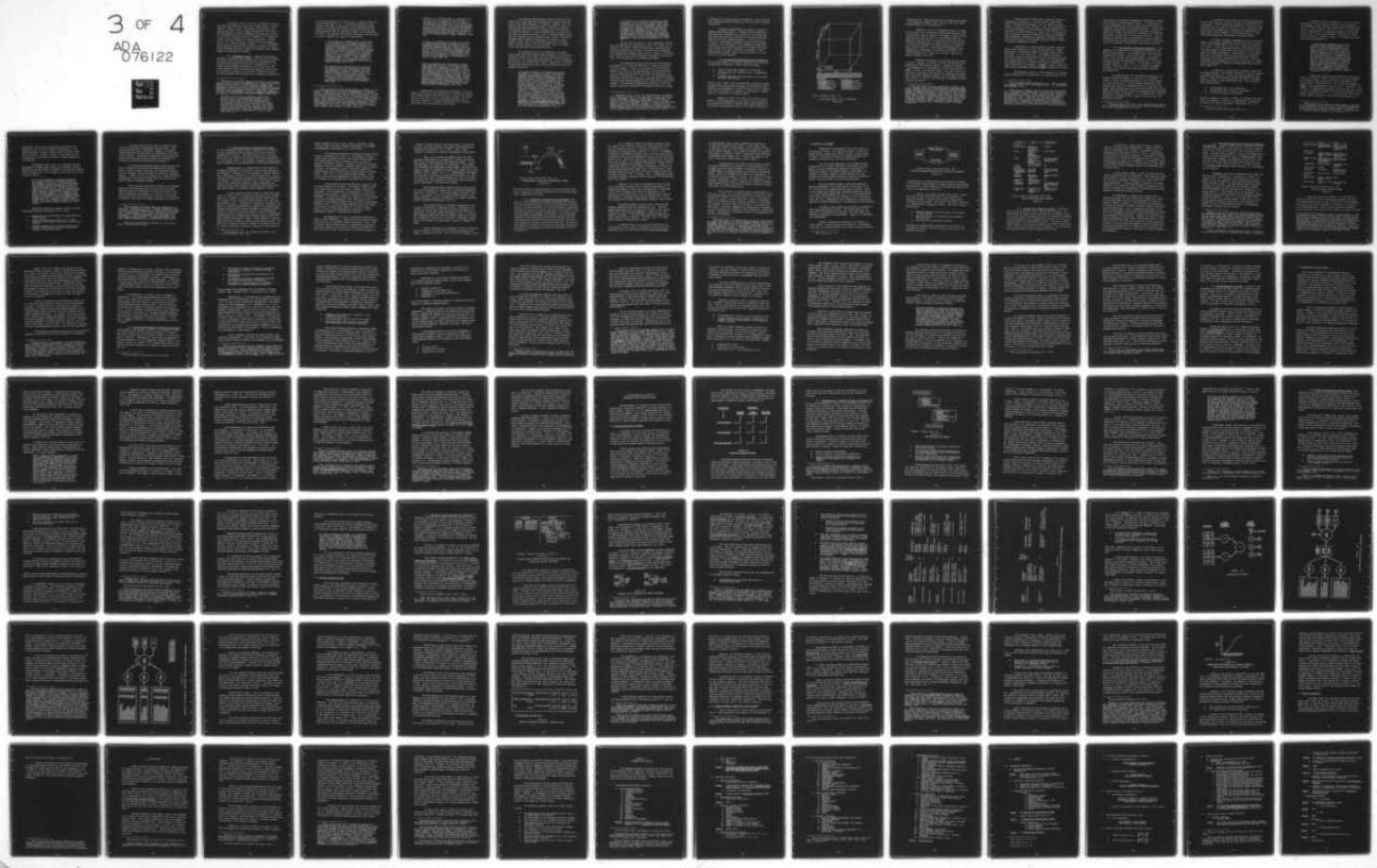

As Robinson (1972: 25) notes, the concept of crisis has often been commingled with such related terms as stress, conflict, tension, panic, catastrophe, and disaster. The various "siblings" can be viewed as precursors, correlates, and consequences of crisis phenomena; alternatively, a specific term may be posited to be the "essence" or an element of crisis. This is especially the case with stress. Milburn (1972: 262) views crisis as a "stress-producing stimulus -- that is, as a form of complex stressor..." or as a phenomenon which typically involves such correlated stressors as information overload, ambiguous threat and situation, and increased number and importance of demands.

5.2.1 Fundamental Issues. Conceptual discussions invariably bifurcate crisis research into two distinct realms: the situational/decision-making/intra-unit perspective and the systemic/interactional/inter-unit vantage point.[10] The former Robinson-Hermann perspective views crisis as a perceived situation while the McClelland tradition treats crisis as an objective change in an inter-unit interaction arena. The five conceptual definitions below illustrate, respectively,

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[10]Actually, the systemic approach consists of two distinct subtypes: the inter-unit or subsystem type (dyads, multilateral actors, regional arenas) and the global or systemic type. McClelland's view of crisis as "an unusual manifestation of the interflow of the activity between the participants" illustrates the first type (see Hermann, 1972b: 6). The global frame of reference is distinguishable from this emphasis on fluctuations in inter-unit interactions, as Wiener's comments demonstrate:

> It seems to me we really practically never talk about crisis in the international system, as such. We don't really talk about international crises. We talk about crises in national subsystems of the international system which are brought on by inputs from the international system. And then, once we are talking about a national crisis stemming from international relations, we may talk about the two linked subsystems and their communication [quoted in Hermann, 1972b: 8].

an extreme situational definition (i.e., a crisis is what the decision maker says it is), a situational definition which reflects the views of participants in the decision process (based on interviews with Foreign Service Officers who had been associated with the Operations Center in the Department of State), the classical situational definition, and two representative "systemic" or inter-unit definitions:

> ...the notion of a foreign policy crisis admits of situations going well beyond the idea of a crisis as involving a deliberate challenge from, or provocative actions by, a rival power. The element of confrontation is a possible, and perhaps even a probable, ingredient of many foreign policy crises; it is certainly not a prerequisite for one. The revolution in the Dominican Republic in 1965 provides a useful example of a foreign policy crisis - in this instance for the United States - on which the element of showdown between two governments was completely absent [Williams, 1976: 22].[11]

> The composite view derived from the interview and questionnaire data associated crisis with the potential or actual involvement of United States national interests, with violence and political instability in unstable areas of the world, with short response time and short duration, and with an element of uncertainty ...disruption of routine and surprise were to some degree associated with crisis [Lentner, 1972: 132].

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[11]This definition is the central subject of Halper's (1971) work on foreign policy crises and "manufactured" or "pseudo-crises." Examples of the latter include the Bay of Pigs crisis, the Dominican intervention, and the Tonkin Gulf affair. On the Bay of Pigs invasion, Halper (1971: 41) concludes that the critical factor was Castro's perceived threat to President Kennedy's image. A key characteristic of a crisis is that it includes "a threat seen as posed to certain desirable appearances, chiefly the appearances of national and presidential strength and resolve [Halper, 1971: 208]." Williams (1976: 85-89) provides a useful summary and critique of Halper's position.

> A crisis is a situation that (1) threatens high-priority goals of the decision-making unit, (2) restricts the amount of time available for response before the decision is transformed, and (3) surprises the members of the decision-making unit by its occurrence....Underlying the proposed definition is the hypothesis that if all three traits are present then the decision process will be substantially different than if only one or two of the characteristics appear [Hermann, 1969b: 414].

> A crisis in international politics is a process of interaction occurring at higher levels of perceived intensity than the ordinary flow of events and characterized by: a sharp break from the ordinary flow of politics; shortness of duration; a rise in the perceived prospects that violence will break out; and significant implications for the stability of some system (or pattern of relationships) in international politics [O. Young, 1968: 15].

> Those environmental and interactional outputs that, phenomenologically, are unusually novel, unexpected, and threatening will tend to overflow the routine processing channels, to spread into normally inactive and inattentive parts of the organizational structure of society, and to generate extraordinary inputs which are returned to the international environment. When, in this situation, a succession of extraordinary inputs begetting new outputs begetting new inputs, etc. passes some point in volume and intensity, the whole phenomenon begins to be called an international crisis [McClelland, 1961: 199].

Questions arise concerning the adequacy of the two types of definitions, the implications of the decision-making and systemic perspectives for research, analysis, and theorizing, and the nature of the relationship between the two. Initially, however, it should be emphasized that conceptual definitions are <u>not</u> operational definitions.

How does one operationalize threat to high-priority goals and to restricted time available for response? With respect to the latter dimension, for example, Robinson (1972: 24) cautions that serious problems arise. Duration is relative and response time should not be equated with clock time for at least two reasons: (1) decision-makers vary in such characteristics as cognitive capacity, and (2) decision-making style and task complexity affect response time. Similar "traveling" problems affect systemic definitions; how should a crisis analyst measure "level of perceived intensity" or "a sharp break from the ordinary flow of politics"? What are "significant implications" for system stability?

The transition from the conceptual to the operational realm inevitably entails some truncation in any concept, unless the latter is so simple that its abstract definition is equivalent to its operational manifestation. This is certainly not the case with international crisis. Compare the two typical "operational definitions" below with the previously noted conceptual definitions:

> For present purposes, an international crisis is defined as a relatively short, time-bounded sequence of interaction between two or more national actors in which the behavior between the participants is highly conflictual but short of war. A crisis is considered a threat to the status quo in the relations between nations involved. The duration of a crisis is here considered to be no more than two months since any prolonged period of high intense conflict is subject to the routinization of conflict....To differentiate a crisis from a war, we shall consider a war to have occurred when each participant has committed major combat units (brigade sized units) to full-scale battle for a minimum duration of approximately one week....With these guidelines in mind, the Yearbooks of the Encyclopedia Britannica (1963-1969) were perused to identify the crises which occurred during the time period June, 1962 to May, 1968 [Phillips and Hainline, 1972: 6].

> ...a "crisis" is a period of increased military management activity at the national level that is carried on in a sustained manner under conditions of rapid action and response from unexpected events or incidents that have occurred internationally, internally in a foreign country, or within the responding country (such as the domestic United States) and that have inflicted or threatened to inflict violence or significant damage to actual or perceived national interests, personnel, or facilities [Hazelwood et al., 1977: 79].

The Phillips and Hainline (1972) operational definition was the basis for generating a list of 21 crises for the specified time frame. While the definition operationalizes duration precisely and provides a criterion for distinguishing unambiguously between crisis and war, "threat to the status quo," which is the crucial conceptual component of the definition, is not delineated in an operational manner.

The operational definition which was formulated by Hazlewood et al. (1977) was employed to compile an inventory of 289 incidents.[12] While it is possible to criticize the emphasis on crisis as "an extraordinary decision-making activity in which existing decision patterns are disrupted by an emergency" (Hazlewood et al., 1977: 79), the operational definition was precise and concerned a delimited class of incidents (extraordinary decision-making activity involving military management). The particular operational definition in this research, which was the product of an explicit decision to adopt

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[12]Hazlewood et al. (1977: 79) stipulate that an incident had to meet one or more of five specific criteria: the initial direct involvement of U.S. military assets; requirement of a military decision; subsequent involvement of U.S. military assets as the crisis unfolded; threat of violence or significant damage to national interests, personnel, or facilities; the requirements of rapid action and response involving military assets. Humanitarian aid and military action cases were excluded. On the updated version of this data set, see CACI (1978b).

a pragmatic (or policy-relevant) perspective, also reflected the inescapably diffuse character of the available conceptual definitions.

Conceptual specification is clearly a prelude to adequate operationalization. Evidence can be marshalled to show that such refinement has occurred in both traditions. The threat-time-surprise components of the situational perspective have been modified slightly. In the inter-unit tradition, considerable conceptual progress has occurred; ironically, the consequence of the subsequent conceptualizing activity has not been propitious for empirically charting "crises" and other interstate interactions. Major breakthroughs, however, would provide the basis for a revolution in crisis research.

5.2.2 The Decision-Making/Situational Perspective. The decision-making or situational definition was initially an outgrowth of Robinson's (1962) threefold scheme:

- Origin of the event (external or internal);
- Time available for response (short, intermediate, or long);
- Relative importance to participants of the values at stake (low or high).

Hermann (1963, 1969b, 1972c) modified this tripartite conceptualization by categorizing occasions for decisions as anticipated or unanticipated, as involving short or long response time, and as involving low, medium, or high threat to goals. Figure 5-1 reproduces the Hermann scheme.

Hermann's (1969a: 202; 1972c: 207) simulation research on crises generated the conclusion that the surprise or anticipation dimension displayed fewer relationships with the process variables than either of the other situational

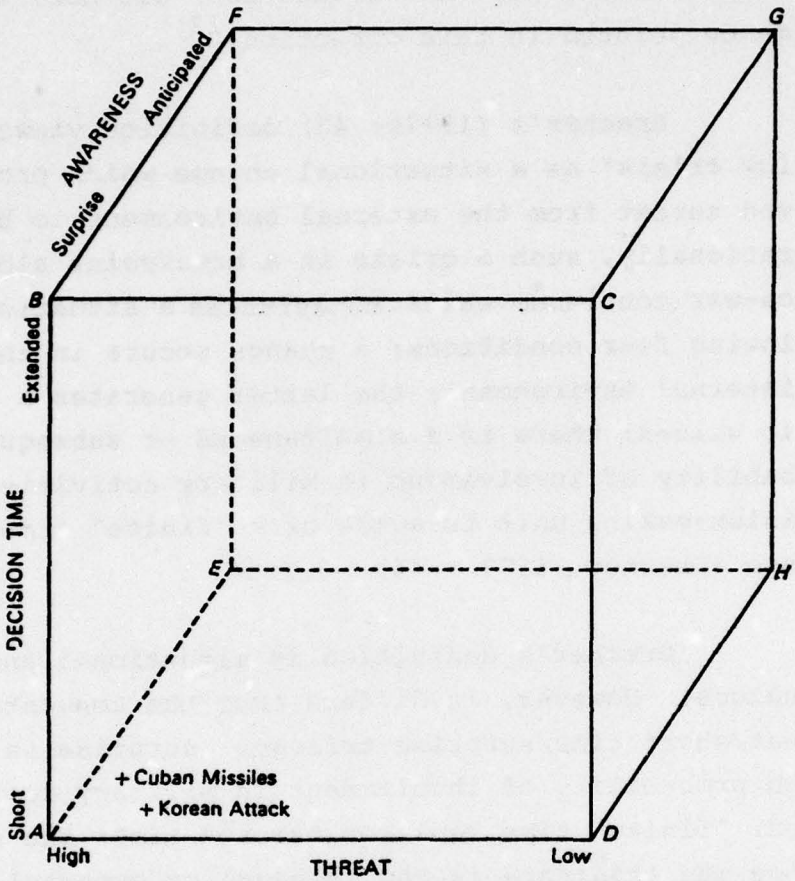

FIGURE 1. A situational cube representing the three dimensions of threat, decision time, and awareness with illustrative situations from the perspective of American decision makers. (*Note*: The representation of a three-dimensional space in a two-dimensional diagram makes it difficult to interpret the locations of the situations; their positions should not be considered exact in any case.)

A. Crisis Situation
High Threat/Short Time/Surprise

B. Innovative Situation
High Threat/Extended Time/Surprise

C. Inertial Situation
Low Threat/Extended Time/Surprise

D. Circumstantial Situation
Low Threat/Short Time/Surprise

E. Reflexive Situation
High Threat/Short Time/Anticipated

F. Deliberative Situation
High Threat/Extended Time/Anticipated

G. Routinized Situation
Low Threat/Extended Time/Anticipated

H. Administrative Situation
Low Threat/Short Time /Anticipated

Source: Hermann (1972c: 14).

SITUATIONAL CUBE: CRISIS DIMENSIONS

Figure 5-1

characteristics. While the exclusion of surprise was judged to be premature, Hermann (1972c: 208) did note that other evidence pointed in this direction.[13]

Brecher's (1977c: 43) definition views a "foreign policy crisis" as a situational change which produces a perceived threat from the external environment to basic values. Operationally, such a crisis is a breakpoint along the peace-war continuum which constitutes a situation with the following four conditions: a change occurs in the external or internal environment; the latter generates a threat to basic values; there is a simultaneous or subsequent "high probability of involvement in military activities;" the decision-making unit is aware of a "finite" time for response (Brecher, 1977c: 44).

Brecher's definition is situational and perceptual in nature. However, it differs from the conventional high threat/short time/surprise trilogy: surprise is omitted; "high probability of involvement in military activities" is added; "finite" time replaces "short" time; the situational change may originate in the internal or external environment. Thus, the threat dimension remains, the time aspect changes from "short" to "finite," and surprise is completely omitted from the definition.

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[13]See the review of crisis literature in Hermann (1963: 63-65). Lentner (1972: 122) discovered that State Department Foreign Service Officers did not invariably consider unexpectedness a necessary attribute of crises; about half felt the crises are often unanticipated, while about the same proportion viewed crises as situations which contain clear warning signs. On the item "A crisis involves an element of surprise," 14 percent responded "always," 66 percent said "often," and 20 percent felt that crises "sometimes" involve surprise. On Hermann's findings, see also the discussion in Brecher (1977c: 42).

Other research suggests that "surprise" should be replaced by "uncertainty." In their work on catastrophe theory,[14] Phillips and Rimkunas (1978: 14) define a crisis milieu in terms of threat, decision time, and uncertainty.[15] In a brief discussion of the relevance of the concept of uncertainty to crisis analysis, O. Young (1975: 150) points out that uncertainty occurs in situations in which the decision-maker possesses "incomplete or imperfect information about one or more factors in his decision calculus, even in terms of objective probability arrays."

Uncertainty is a more productive concept than surprise, which refers only to the initial phase of a crisis. Uncertainty, in contrast, refers to various stages, levels, and types. O. Young (1975: 151), for example, refers to uncertainty about the alternative set for a given choice problem, the criterion of choice (i.e., what is to be maximized), the probable behavior of others, and the key difference between uncertainty with respect to <u>whether</u> a given outcome will occur versus uncertainty concerning <u>when</u> an outcome will occur.

The potential utility of the situational or decision-making perspective is attributable, to a great extent, to the

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[14] On catastrophe theory, see Holt et al. (1978), Phillips and Rimkunas (1977, 1978), and Zeeman (1976). On uncertainty, see Nicholson (1972).

[15] Phillips and Rimkunas (1978: 24) aver that the replacement of surprise with uncertainty is justified for empirical and mathematical reasons. Crisis situations seem to occur in situations of both low and high surprise (see also Phillips and Hainline, 1972). Surprise is a dichotomous variable whereas uncertainty allows for measuring the reliability of the situation. Uncertainty measures how much information is necessary (input uncertainty) and how certain decision-makers are that an action will limit the threat (output uncertainty).

fact that it is implicitly embedded in a typology of foreign policy situations (see Hermann, 1969b). To anticipate one of our conclusions, we wish to stress that crises have too frequently been treated as isolated phenomena. International crises are elements of international politics; a theory of crisis will almost inevitably be a sub-theory of a more general theory of politics or international politics. The dimensions of threat, time, and uncertainty can be viewed as the fulcrum for conducting research on a panoply of international (and perhaps intranational) events and situations.

5.2.3 The Systemic/Interaction Perspective. Developments in the inter-unit or interactional tradition have been more stimulating -- and therefore less auspicious for concerns that relate to science and theory. In a relative sense, there has been some cumulativeness in conceptual analysis from the decision-making vantage point; such work is more proximate -- relatively -- to the ideal of "normal science" (see Kuhn, 1970). In vivid contrast, conceptual activity in the interactional school has been decidedly pre-theoretical.

As noted earlier, the interactional definition emphasizes significant shifts in inter-unit relationships. A crisis, in fact, is defined empirically as an abrupt change in volume and variety.[16] Prior research demonstrates that quantity and variety (as measured by Hrel or relative uncertainty) both increase as an interacting dyad enters the crisis phase. Indicators derived from event-interaction data have been employed to track or forecast (i.e., retrospectively "predict") crises and to determine crisis phases, turning points, and abatement processes.

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[16]See McClelland (1968, 1972); also pertinent are Andriole (1976), Andriole and Young (1977), Daly (1978a), McClelland et al. (1971), and Spector et al. (1975).

A theoretical purist would have serious qualms about the fact that the data literally dictate the manifestations of the concept. From a theoretical perspective, crisis has been converted from an elaborate concept to a set of empirical measures and the pre-theoretical foundation of events data and quantitative crisis research -- the systems analogy -- has been almost completely disregarded in the past decade.

The recent conceptual developments in the inter-unit school have emanated exclusively from the work of McClelland (1974, 1975a, 1975b, 1975c, 1976, 1977, 1978b; McClelland et al., 1976). In his conceptual analyses, McClelland has initiated the process of moving away from "crisis" to more fundamental and generic phenomena. Simultaneously, he has shifted the focus of attention from discrete (and easily measured) events to more elusive situations and conditions. While an assessment of the prospects for theory in this area are premature, the preliminary conceptual underpinnings have at least been fleshed out.

In traditional international relations, crisis had a distinct meaning. The concept referred to a discrete episode and focused attention on a particular state between war and peace.[17] While the historical context may shift, the common attributes remain. Thus, McClelland (1977: 16-18) isolates three crisis series:

- The pre-World War I era (1904-1914);
- The pre-World War II period (1935-1939);
- The Cold War pattern (1948-1964).

Presently, however, a crisis is "simply an emergency situation that is responded to according to a perception of danger and an urge to act against the danger [McClelland, 1977: 25]."

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[17] See also Snyder and Diesing (1977: 3-4).

Perceived dangers and emergency situations include traditional military-national security crises, energy and environmental crises, economic crises, and a bewildering profusion of other "crises." McClelland (1977: 22) notes that of ten "high tension" international episodes in the decade 1966 to 1975, only three conformed to the Cold War crisis series patterns; all three occurred in the Middle East arena. As McClelland expressed it:

> ...the deterrence mechanism was once the principal means of meeting threat. The problem of intelligence-gathering was, then, to obtain reliable data on Soviet capabilities and, to a lesser extent, on Soviet intentions. Now, in the post-Cold War era, there are new circumstances in the world environment to consider. There are new kinds of threats to be taken into account. They come from different places and can involve many parties....Defense still includes the military concern, but defense also needs an addition so that there exist a readiness and capability to deal with dangerous situations that have no connection with soldiers, weapons, or warfare [1977: 25].

McClelland urges that more attention be accorded to threat situations.[18] Threat recognition and threat response are viewed as "better objects for theory development than crisis itself" (McClelland, 1977: 25). While the concept of threat is not systematically articulated as a component of any "theory" of international relations, the idea does play a pivotal role in deterrence theory in the field of national security studies (McClelland, 1974: 1). In both national and international politics, threats -- which involve anticipation of

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[18]This discussion is based on several sources; see especially McClelland (1975a and 1974). The empirical dimension of the research will not be discussed here; on "dangers" or D-files data, see McClelland (1978a, 1978b) and McClelland et at. (1976) as well as section 3.3.4 above (p. 67).

approaching "harm" from the individual perspective and impending "ruin" from the systemic vantage point -- are almost universal in terms of the sources and objects which may be pertinent. Threat "regions" on the cognitive map and specific, active threat "fields" in threat regions can be pinpointed.

McClelland (1978b; 1975a: 26) maintains that the mass media of communication function to illuminate salient dangers and provide alarms of impending and activated threats. Public sources, then, can be tapped to trace the ebb and flow of threat signals:

> It is to be assumed for purposes of research and testing that there is displayed daily at the "window" of the print and electronic media the important content from which is drawn the social equivalent of the individual's threat region and threat field....Event analysis, discussed earlier in the context of crisis measurement, thus has a theoretical grounding in the study of threat dynamics. By extracting indicators of the symbolic overlay, research should be able to produce not only an estimate of what matters exist on a country's national threat agenda, but also a record over time of the variations in the threat burden [McClelland, 1975a: 29-39].

Appropriate empirical research consists of three intertwined subtasks (McClelland, 1975a: 40-41):

- Monitoring the threat agenda and ascertaining the threat burden;
- Compiling international event files to amass evidence on the potential sources of threat activation;
- Devising procedures for deriving indications of movement between passive awareness and active response to perceived threat.

The resulting data sets could be employed inductively for purposes of forecasting and monitoring. From the theoretical frame of reference, however, the central concern would be the elucidation of event-threat and threat-crisis linkages. Theoretical perspectives from various traditions and disciplines might provide the foundation for constructing theories and generating hypotheses.[19]

The existing theoretical base is both implicit and weak, although the conceptual developments are promising. Threat, crisis, stress, situations, and conditions comprise the core concepts; these constitute the potential conceptual scheme. A theory is a set of concepts and a deductive set of propositions; the distance between the status quo and the goal of theory is obviously immense.

Such vital but preliminary activities as conceptual definition and refinement have not even been confronted. Massive operational obstacles also exist; how should situations be measured, for example? In contrast to the events-data-crisis-interactional research, we do not even possess an empirical base with some temporal and spatial variation.[20]

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[19]The relevance of systems theory and cybernetics are referred to in McClelland (1974). Stress, perception, cognitive maps, and other psychological concepts are clearly germane, as McClelland's (1975a: 18-21) discussion of the event flow to threat recognition process in the individual case illustrates. Cognitive processing and other models from psychology could be explored. On mass communication and other societal perspectives, see McClelland (1975a: 22-37).

[20]Data are currently being collected in a real-time mode; see McClelland (1978a).

5.2.4 Types and Phases of International Crises. For the foreseeable future, crisis research will continue to reflect the decision-making/interaction dichotomy that has pervaded prior inquiry. Even more probable is a projection which takes into account the estimate that theory development is "light years" away. In the interim, conceptual theoreticians could concentrate on the delineation of crisis types and phases.

Classification is a prelude for the development of systematic knowledge in any field of inquiry which aspires to be scientific. Whether it be for purposes of coherent description, explanation, prediction, or theory construction, classification is appropriately regarded as an essential precondition for progress. Conceptualizing activity in the realm of crisis analysis has emphasized procedural versus substantive and decision-making versus systemic definitions; few efforts have been made, however, to generate typing schemes of crises.

A crisis typology could be based on behavioral dimensions (R. Young, 1975), on attributes of crisis units (Wilkenfeld et al., 1978b), or on behavioral patterns which are the joint product of the outputs of participating units (Phillips and Hainline, 1972). In addition to behavioral, attribute, and dyadic (or interacting participant) typologies, classification schemes could highlight issues, antecedents, bargaining characteristics, objectives and policy choices, and consequences. Discussions which accentuate the impact of type of international system suggest that classification schemes based on that attribute should be developed.[21] Kahn's (1965) definition implies a typing distinction based on nuclear and non-nuclear crises. The CACI crisis inventory contains a number of variables which may be viewed as potential typological dimensions; among these are

[21] See McClelland (1977: 22), Snyder and Diesing (1977: ch. 6), and Williams (1976: 32-55).

power comparison, type of issue, region, contiguity, number of prior cases, political structure difference, and economic interdependence (see Moore et al., 1975: 60-75).

Most existing typologies are based on obvious classificatory attributes; Bell (1971: 8), for example, differentiates among adversary crises of the central balance (such as the Cuban missile crisis), adversary crises of the local balance (the Kashmir dispute), intramural crises of the power spheres or alliance systems of dominant powers (such as Cyprus and NATO), and intramural crises of regional alliances or organizations (such as Biafra and the Organization of African Unity). Bell (1971: 9) also distinguishes between a "true crisis" and two similar phenomena: a subcrisis (such as the U-2 incident) and a pseudocrisis (the Tonkin Gulf "crisis").

Crisis should also be considered as a type in a more inclusive classification system. The Hermann (1969b) definition treats crisis as one cell within a general typology of situations. Both conceptually and empirically, crises can be analyzed most profitably if they are compared to non-crisis phenomena. The recurring emphasis on crisis as "a real prelude to war and an averted approach to war" (McClelland, 1972: 3) highlights the proximity between certain crises and the danger/outbreak of war. A more inclusive approach would view crisis as one type of international behavior; as noted earlier, a theory of crisis would undoubtedly be anchored in a more comprehensive theory of international relations.

The phenomenon of crisis is generally viewed from a phase or stage perspective. Crises have discernible beginnings, turning points, and abatement phases (McClelland, 1972). One of the most popular phase models of international conflicts is the CASCON (Computer-Aided System for Handling Information on Local Conflicts) system, which posits five distinct phases of

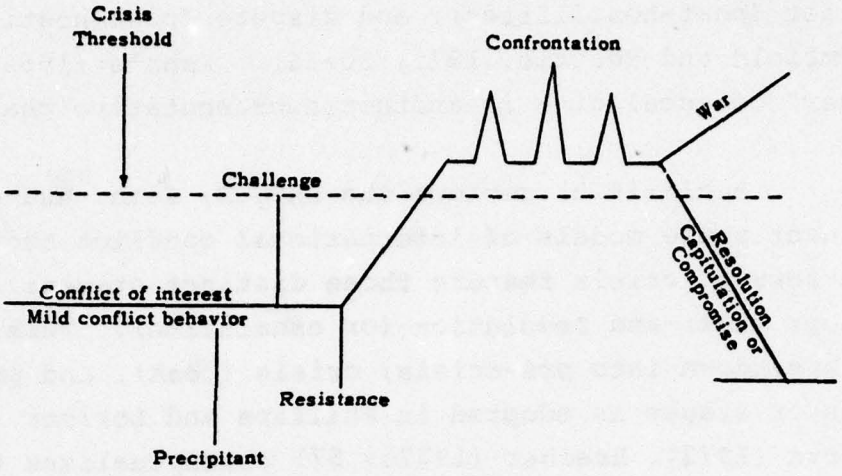
a dispute: dispute; conflict (pre-hostilities); hostilities; conflict (post-hostilities); and dispute (post-hostilities) (Bloomfield and Beattie, 1971: 35-36). Kahn's (1965) "ladder" of escalation is another representative phase model.

Beal (1975) reviews the CASCON, Kahn, and other prominent phase models of international conflict and crisis. Most views of crisis feature three distinct stages: initial buildup; peak; and resolution (or escalation). This tripartite breakdown into pre-crisis, crisis (peak), and post-crisis phases or stages is adopted in Phillips and Lorimor (1974) and Schwartz (1972). Brecher (1977c: 57) conceptualizes the dependent variable of behavior or crisis decision-making as a decision flow over time -- through periods of a crisis situation; the latter are trichotomized into pre-crisis (pre-decisional), crisis (decisional), and post-crisis stages.

The three-phase model reflects common sense notions of a crisis sequence and assumes that crises have discernible phases or "life cycles." The latter premise is clearly justified. The problem is that the analyst should attempt to demarcate shifts of analytic significance, not simple sequential states (Bloomfield and Beattie, 1971: 35).

The latter strategy is obviously reasonable in the context of profiling or describing crises; in addition, the trilogy of buildup, peak, and resolution may be simplistic or empirically inaccurate. Synder and Diesing (1977: 15) posit a more elaborate phase model which includes a conflict of interest, thresholds, precipitants, challenge, resistance, confrontation, and outcome (war/resolution); Figure 5-2 depicts the model.

From an explanatory or theoretical frame of reference, work is required that would yield analytical boundaries for phases or stages of a crisis. As a "life cycle" process, crisis



Source: Snyder and Diesing (1977: 15).

INTERNATIONAL CRISES AND INTERNATIONAL THEORY

Figure 5-2

may most usefully be conceptualized in terms of a phase typology. Eventually, interacting typologies of crises and phases may be specified and refined.

5.2.5 Conceptual Proliferation and Extension. The study of international crisis behavior presumes the existence of a valid conceptualization of the primary dependent variable. Reality is less encouraging; since the emergence of competing definitional traditions, crisis researchers have tended to adopt a decision-making or systemic perspective. More recent analyses have simply acknowledged the existence of two conceptual candidates, catalogued the more prominent examples from the Robinson-Hermann and McClelland-Young inventories, and more or less arbitrarily selected a preferred definition. The choice was generally dictated by idiosyncratic researcher preferences and socialization experiences and by the constraints of data availability.

In a fundamental sense, the dispute revolves around the issue of the validity of objective characteristics vis-a-vis the alternative option of treating a situation as it is perceived by decision-makers. Moore et al. (1975: 4) attempted to resolve the problem by assuming that a list of crises defined in systemic terms would simultaneously tend to include decision-making crises. While this rationale is plausible for most cases, there are at least a few instances when decision-makers perceive a crisis unilaterally and perhaps "incorrectly." Halper (1971) argues that the Bay of Pigs incident constituted an "image crisis" for the United States rather than a "genuine crisis." Manufactured crises such as the Gulf of Tonkin incident should also be noted (see Bell, 1971: 9; Halper, 1971). Misperceived crises and public relations exercises should obviously be distinguished from "true crises."

Adoption of an inter-unit perspective does not simplify the matter; analysts still confront the problem of distinguishing between a crisis and a pseudo-crisis. McClelland (1972: 84-85) discusses the resulting complexity of the analytical task and provides a list of possibilities (such as fluctuations in exchanges which may be mistaken for a crisis and a pseudo crisis which inadvertently becomes a real crisis).

The decision-maker or actor point of view and the systemic approach cannot be reconciled by fiat. Decision-making crises which are not inter-unit crises -- such as the revolution in the Dominican Republic in 1965 and the 1956 upsurge in Hungary -- are perceived as genuine threats which pose a short time for response. Williams (1976: 23) labels such incidents "foreign policy crises."

A foreign policy crisis can be contrasted with an international crisis, which is concerned by definition with a particular type of relationship between <u>two or more states</u>.

An international crisis, then, presumes the existence of at least two foreign policy crises. A major power crisis -- what Bell (1971: 8) would refer to as an adversary crisis of the central balance -- will almost inevitably be an inter-unit crisis. Intramural crises -- especially those involving a superpower and a weaker ally -- provide the arena for the bulk of the purely foreign policy crisis cases.[22]

The extension of the scope of the concept of crisis is clearly required in the context of the McClelland (1977) argument about the recent systemic transformation and the increased number of phenomena which now constitute international crises. While the transformation issue may be debatable, it is obvious that the concept of crisis -- at least in its popular and, increasingly, academic lexical manifestations -- now subsumes a disparate range of "emergencies." Recent discussions about economic crises illustrate the concept-extension process (see Morse, 1972 and Parker, 1977b).

The oil crisis, the energy crisis, the Watergate crisis, and a lengthy list of other examples all show that crisis now portends something different than in 1938 or 1962; the references to global or world crises also signify a fundamental shift in the denotative and connotative aspects of the concept. The tendency to define crisis too narrowly or too broadly has been noted in the past; expanding the terminological boundaries too much may deprive the concept of any analytical or theoretical utility. Nevertheless, the eventual need to reconceptualize crisis may be unavoidable.

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[22]Williams (1976: 24) suggests that intramural crises should be viewed as problems of alliance management rather than crisis management and reserves the latter term for adversary crises; the subsequent focus is limited to superpower confrontations and "acute international crises." The key aspect of the confrontation is the danger that large-scale military hostilities might erupt. Williams (1976: 6-7) notes that "important" cases are thereby omitted, such as the 1946 conflict over Iran and the Suez episode in 1956.

5.3 Theoretical Fragments

Fragmentation characterizes the existing work on international crises. The tendency has been to conduct research within a theoretical vacuum or posit a single theory or model. The parallel testing of theories has been rare; attempts at synthesis are virtually nonexistent.

One of the few exceptions is the landmark Snyder and Diesing (1977) study. Theories on bargaining, decision-making, and the international system are integrated in a convincing fashion. The analysis draws on game theory, information processing research, belief systems work, the rational actor and bounded rationality theories of decision-making, and bureaucratic politics interpretations.

While the massive scope of the study precludes a detailed assessment of its contribution to a theory of crisis, several overall generalizations should be noted. First of all, Snyder and Diesing apply abstract, deductive theories to 16 case studies between 1898 and 1973.[23] The interplay between theory and cases and the richness of the illustrations augur well for a comparative case as opposed to a statistical approach to theory construction in international crisis analysis.

Secondly, crisis theory should involve a blending of game theory and decision theory. The former describes the structure of the bargaining situation; the latter shows how bargaining structures are constructed. Figure 5-3 illustrates the relationship.

Thirdly, bargaining is posited to be central to crisis theory. System structure and alignments, information processing, and decision-making are treated as special features

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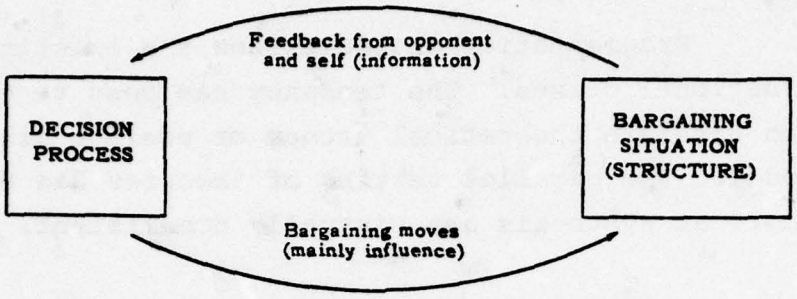
[23] See Table 4-2, p. 134.



Source: Synder and Diesing (1977: 410).

MEDIATION BETWEEN DECISIONS AND BARGAINING SITUATION

Figure 5-3

of bargaining or as factors which are external or internal to the states involved which influence the bargaining process. The results for crisis bargaining structures and typical outcomes are summarized in Table 5-1.

Fourth, the concepts of power and values -- which have been central reference points in all subfields of political science -- emerge as the primary components of a potential crisis theory. The idea of "structure" functions as a superordinate integrating concept. The term is used in three senses:

- The distribution of military power in the international system;
- The distribution of influence in the national decision unit;
- The preference structures of states.

The first two reflect power considerations and constitute independent variables; the third indexes values and is the dependent variable.

Structures	Cases	Typical Outcomes
Symmetrical		
1. Prisoner's Dilemma	Agadir, 1911 Berlin, 1958–1962 Yom Kippur, 1973	Compromise
2. Chicken	Munich, 1938 (late phase) Berlin, 1948 Lebanon, 1958 Iran, 1946 (late phase)	One side capitulates
3. Leader	Bosnia, 1908 (early phase) Germany–Austria, 1914 Ruhr, 1923 Iran, 1946 (early phase)	One partner leads, the other follows; or alliance or détente breaks up
4. Deadlock	U.S.–Japan, 1940–1941	War
Asymmetrical		
5. Called Bluff (one party in Prisoner's Dilemma; other in Chicken)	Morocco, 1905 Quemoy, 1958 Cuba, 1962	Capitulation by Chicken party or unequal compromise
6. Bully (Bully-Chicken)	Fashoda, 1898 Bosnia, 1909 (later phase)	Capitulation by Chicken party
7. Bully-Prisoner's Dilemma	Germany–Austria vs. Russia–France, 1914	War
8. Big Bully (Big Bully-Chicken)	Munich, 1938 (early phase)	War (avoided in this case by shift of German structure to Chicken or Bully)
9. Protector (Bully-Leader)	Suez, 1956 (U.S.–Great Britain) Quemoy, 1958 (U.S.–Taiwan)	Dominant ally protects and restrains client

Source: Snyder and Diesing (1977: 482).

CRISIS STRUCTURES AND OUTCOMES

Table 5-1

5.3.1 Criteria for a Theory of Crisis. A theory of crisis would account for one or more of the following: the determinants of crises (crisis anticipation or warning); behavior during crises and crisis resolution or abatement processes (crisis management); the consequences of crises for the actors involved and/or the international system. A genuinely comprehensive theory of crisis would explain and predict crisis occurrence, behavioral patterns during the sequence, and termination from decision-making and/or systemic perspectives.

No theories of crisis currently exist. However, there are some promising "metatheories." Bobrow (1972) contrasts a metatheory with a theory; a metatheory instructs the analyst to think about X as if it were Y. Metatheories, unlike theories, are not falsifiable. A metatheory, however, can function as a heuristic, sensitizing aid; an analogy from another field of inquiry is an example of a metatheory. Among the prominent metatheories in crisis analysis are game theory, communications theory, decision theory, and industrial negotiations theory.

In more general terms, an array of models and theoretical perspectives can be identified. Among these are models from psychology (stress, perception, etc.), social psychology and sociology (groupthink, bureaucratic politics, etc.) and other disciplines. Stimulus-response analogies, the systems framework, and bargaining theory exemplify perspectives from political science and international relations which have been employed to describe and analyze crises.

The assessment of theory below assumes that pretheoretical models and quasi-theoretical perspectives constitute an appropriate route to the construction of theories. Existing research, however, is often exclusively descriptive in nature and evinces no direct or indirect concern with theoretical perspectives. This is especially applicable to the crisis warning aspect of the anticipation/management dichotomy. The crisis management literature is both more voluminous and less stridently non-theoretical. However, the latter is often narrowly normative in its concern with manipulating or "managing" conflicts and crises. The evaluation will be organized in terms of the anticipation/management and pre-crisis/crisis/post-crisis distinctions; the competing decision-making and interaction-systemic frames of reference will recur throughout the assessment.

5.3.2 The Determinants: Crisis Anticipation/Warning and Avoidance. Extensive quantitative, descriptive work has accrued on the subject of the beginning of crises; examples include Azar (1972) and McClelland (1972; McClelland et al., 1965). Research which attempts to unearth the determinants of crises in a more fundamental sense is disappointingly rare. Some empirical "mapping" has generated trend profiles involving the number of types of crises across time (see, e.g., Moore et al., 1975), but the isolation of factors and sets of influences which produce crisis situations is a neglected area of inquiry.

Perceptual and similar variables clearly shape the decision unit's treatment of a situation as a crisis. As Lentner (1972: 133) concludes, the perceptions of policy-makers will be one important factor which determines their behavior during crises. The same generalization applies to perceptions in the pre-crisis period; perceptual screens intervene between "reality" and the actor's response to incoming stimuli.[24] This suggests that one determinant of crises may be found within the belief and perceptual systems of decision-makers.[25] Table 5-2 illustrates some typical initial or pre-crisis belief systems. Other factors could be explored as potential sources of crisis sequences; the domestic politics, bureaucratic politics, and groupthink hypotheses are among the most salient.

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[24]Bobrow et al. (1977: 201-202) criticize the practice of fleshing out decision systems with cross-nationally uniform sets of rules; they argue that it should not automatically be assumed that heterogeneous decision systems follow a common set of rules. To the extent that their caution is warranted, actor specific research would be necessary. The results for a comparison of their findings for China's views on crises with the results reported in Lentner (1972) are supportive of their position (see Bobrow et al. 1977: 204-205). See also Bobrow et al. (1979: chs. 5-6).

[25]Other variables at the psychological level of analysis may be pertinent in certain contexts; for example, personality

	Hard Line	*Soft Line*
World Views ("Theories")	Emphasis on conflict; power-strategic considerations.	Emphasis on potential harmony; intrinsic (non-strategic) values; affective elements.
Image of Opponent		
Ultimate aims	Unlimited expansion or defense of illegitimate status quo	Limited legitimate expansion or defense of legitimate rights
Specific aim in present crisis	Achieve one part of expansion program; test one's resolve; defend illegitimate position	Satisfy particular interest, probably legitimate
Preference function	Chicken; overestimate *S*	Underestimate *T* and *S*; overestimate *R*
Unity of government	Monolithic	Divided
Bargaining style	Cool, calculating	Provokable, unstable, but potentially "reasonable"
Probable strategy	Opposite to one's own	Reciprocates one's own
Image of Self		
Ultimate and specific aims	Defense of legitimate status quo or legitimate expansion	Defensive
Preference function	Usually *PD;* low *S*, high *P*, low *R*	Usually Chicken: high *S*, low *P*, high *R*.

Source: Snyder and Diesing (1977: 308).

TYPICAL INITIAL BELIEF SYSTEMS

Table 5-2

Levels and units which refer to a single decision-maker's (or decision unit's) perceptions exemplify the actor or decision-making point of view. Theories of crisis determinants could also be the outgrowth of research in the systemic or interactional mode. Simple stimulus-response, mediated stimulus-response, and other hostile models are obvious examples.

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characteristics may predispose certain decision-makers to view situations as crises. See De Rivera's (1968: 189-205) discussion of aberrant personalities and distortions in perceptions and thinking. To the extent that such influences operate, they would presumably be magnified in intramural crises involving a superpower and a satellite and may be minimized in adversary crises which threaten war; see Williams (1976: ch. 3) for a discussion of rationality versus competing irrational interpretations (stress, groupthink, etc.) in serious superpower confrontations. For a different viewpoint, see Snyder (1978).

Snyder (1972: 219) refers to two pre-crisis variables which exert an impact: systemic environment and bargaining setting. The former includes such factors as the general structure of the system and the existing alliance patterns and ties; contained within the latter realm are such immediate background factors as recent relations between the actors and their relative military capabilities. While Snyder treats these variables as influences on the structure of the crisis, the systemic context and the setting are also among the determinants of the occurrence and nature of crises; they interact to determine if and when crises occur and shape the type of crisis if one ensues.

Almost no sustained quasi-theoretical activity can be linked with the question of identifying the determinants of crises. The existing work in the pre-crisis domain is descriptive in nature and has been concerned primarily with crisis avoidance and/or warning. The latter emphasis has reflected applied objectives. As a result, the crisis forecasting literature has expanded considerably in the last decade. Time-series methods, econometric methods, and other techniques have been employed to forecast levels of conflict, war, and crisis (see Parker, 1977a: 231-238). The theoretical foundation for this methodological activity has not been developed.[26]

The distinction between precipitants and preconditions suggests a projected direction for scientific or theoretical

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[26]Since my focus in this chapter is on the assessment of crisis research from the perspective of evidence of and prospects for theory development, I have consistently applied theoretical criteria in the evaluation of research. I have intentionally avoided a lengthy discussion of the issue of basic versus applied research (and the related questions involving the putative impact of theory on policy-relevant activity). Some comments on this subject will be offered in the conclusion of the chapter.

research on determinants of crises. Eckstein (1965) originally applied the precipitant/precondition distinction to the subject of internal war. A precipitant is a specific factor which immediately precedes the dependent variable. Precipitants are thus event-specific and highly context-dependent. A seer with a crystal ball might predict that unique event X will produce a crisis between actors A and B on a given date; social scientists will never produce that kind of prediction (i.e., prophecy).

Preconditions, in contrast, refer to classes of determinants. The relationship between the distribution of power in the international system -- reflected in the series of hypotheses about the impact of unipolar versus bipolar versus multipolar power configurations -- and various forms of international behavior illustrates research on preconditions. Global or systemic preconditions are almost impossible to manipulate in the short run, although decision processes, decision-maker characteristics, and other classes of determinants are more susceptible to policy intervention. In any case, a theory of crisis will concern preconditions, not precipitants.

5.3.3 Crisis Decision-Making and Resolution/Abatement. Decision-making and systemic research on the subjects of behavior during crises and the resolution/abatement of crises is much more extensive than the available analyses of the determinants of crises.[27] Propositional inventories have appeared on the decision-making or crisis management research terrain. For example, Shapiro and Gilbert (1975) limited their focus to psychology and social psychology and amassed 81 propositions dealing with:

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[27]See the sources cited above in note 2 (p.168).

- The effects of stress on cognitive, perceptual, and affective behaviors and decision-making performance;
- The effects of personality characteristics on performance;
- The effects of crisis on interactive processes and group decision-making performance;
- The effects of group structure on interactive processes and decision-making performance.

Several models and frameworks have also emerged, including Allison (1969), Brecher (1977c), and Snyder et al. (1962).

Unfortunately, the proliferation of propositions and frameworks has not augured well for the development of theory -- or, for that matter, theoretical perspectives. Quantitative studies of crisis management (e.g., Hazlewood et al., 1977) and resolution or abatement (e.g., McClelland, 1972) have been decidedly atheoretical. Much of the early work on decision-maker perceptions during crises was explicitly descriptive in nature (see, e.g., Hilton, 1969). The research which has been conducted under the rubric of one of the models or frameworks -- such as McCormick's (1975) test of Allison's organizational process model in two Middle East crises or Paige's (1968, 1972) application of the Snyder decision-making framework to the Korean War and Cuban missile crisis cases -- has not foreshadowed the development of crisis theory.[28]

Crisis management research has often adopted a decision-making perspective. Thus, much of the inquiry has emphasized internal decision dynamics and processes, with a consequent

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[28]Some crisis analysts view the framework construction and application approach as the preferred route to theory (see, e.g., Brecher, 1977c: 60). While comprehensive frameworks are appropriate for organizing research and discerning patterns (i.e., for descriptive purposes), the taxonomic fallacy suggests that grand frameworks mitigate against theory (see O. Young, 1972: 198).

focus on psychological and social psychological concepts and models. Prominent among these have been perceptions, stress, information variables, the organizational setting, bureaucratic politics, small group decision units (and the accompanying groupthink hypothesis), and other influences which reflect decision-maker, decision-unit, and domestic political forces and conditions.

The Stanford Group focused on the individual actor unit and level of analysis and generated a number of empirical propositions about decision-maker perceptions of hostility and other factors (see Hilton, 1969; Hoole and Zinnes, 1976; Holsti, 1972). As noted, the initial research was descriptive in nature and concerned such critical decision context variables as perceptions of time pressures, alternatives, capability, hostility, coalition phenomena, and other factors. Hilton (1969: 118) divides the Stanford content analytic research into three categories:

- Studies in which tension or hostility is the independent variable;
- Across-the-model tests of the S-r:s-R model;
- Across-the-model tests of the S-r:s-R model, with added tests for sequential patterns.

The Stanford studies generated an impressive number of propositions about crisis behavior, stress, perceptions, and the pattern and volume of communications. While the substantive findings relate only to the 1914 and Cuban missile crises -- with additional comparisons involving the Stanford data and historical and simulation data (e.g., Schwartz, 1972) -- the procedures which were devised and implemented for the content analysis of documentary data could be employed for any cases and time frames for which appropriate source material is available. The Stanford researchers applied an array of

analytical and methodological strategies, ranging from inferences derived form visual inspections of the data to a Markov chain model approach.

Theoretically, the Stanford studies were anchored in a mediated stimulus-response model, which allows measurement at four different points:

- Incoming stimuli (S);
- Perceptions of the stimuli (r);
- Statements of plans and intentions (s);
- Responses (R).

The S-r:s-R model is obviously superior to unelaborated action-reaction or stimulus-response models.

The scope of the model is clearly general; it enables researchers to compare crises across temporal and spatial parameters. Perhaps most appealing is the fact that the model implicitly assumes (or permits) an interaction perspective. For example, Schwartz (1972) integrates the decision-making focus of the Stanford model with such interaction and systemic phenomena as alliance cohesion, escalation processes, and type of international system.

A considerable amount of the crisis management or decision-making research has been organized in terms of an overarching framework or model. Allison (1969) delineates three competing models in his analysis of the Cuban missile crisis:

- Rational Policy;
- Organizational Process;
- Bureaucratic Politics.

The first assumes that foreign policy outputs are rational products of unitary actors; Snyder (1972) and Wagner (1974) viewed crisis decision-making as a "rational actor" process. The organizational process paradigm highlights the role of standard operating procedures and the search behavior of complex organizations; Tanter (1972) applied the model in an analysis of alliance behavior during the Berlin crisis of 1961. The bureaucratic politics model analyzes foreign policy-making as the product of bargaining among players occupying different hierarchical positions (Allison and Halperin, 1972: 43).

All three perspectives emphasize the actor point of view, although the rational actor model can be applied to bargaining, game theoretic, and other interaction-oriented models of analysis (see Snyder, 1972; Snyder and Diesing, 1977; Tanter, 1975). Furthermore, the organizational process and bureaucratic politics models suggest that internal political factors intrude upon the crisis decision-making process.

Critics of the relevance of the organizational process, bureaucratic politics, and other internal political models (such as the popular groupthink research) maintain that crisis policy-making is a rational process and/or that dyadic and other systemic factors account for almost all of the variance in crisis behavior. The argument that crises involve high level elites and perhaps a small ad hoc group is admittedly compelling (see Paige, 1968, 1972).[29] McCormick (1975: 21) explicitly incorporates the criticisms into his research design by limiting the Allison organizational process model to less intense periods of a crisis, when a model which explains incremental, routine decision processes would be most applicable.

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[29]However, Sndyer and Diesing (1977: ch. 5) report that the utility maximization or rational actor theory does not hold, although the bounded rationality model provides a good fit with the data.

Tests of organizational process and bureaucratic politics models have been rare. As noted, Allison (1969) used the three models as alternative metatheories for explaining the Cuban missile crisis. Tanter (1972) and McCormick (1975) operationalized the organizational process model and compared the individual effects of the latter and an event-interaction model; both also attempted to synthesize the two into a combined interaction/organizational model.

As Bobrow (1972: 24) notes, the Tanter (1972) research design did not really constitute a valid test of the combined model; coefficients were not reported where one cluster is used to modify the impact of the other on the dependent variable. The indirect operationalization of the organizational process model also posed a serious problem in both studies.[30]

Much of the psychological and social psychological research on crisis decision-making has entailed the testing of ad hoc hypotheses about perceptions, small group decision processes, or some other specific factor at the individual or small group level of analysis. Metatheories such as the mediated stimulus-response model and the organizational pro-

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[30]The Allison version of the model predicts that an organization's behavior at t is explained by behavior at t-1. Both Tanter (1972) and McCormick (1975) employ the strategy of examining the behavioral outputs of the organizational routines and repetoires of the organization. It is the latter which is posited to be the real determinant of behavior. McCormick's (1975: 20) assumption that behavioral indicators "tap the underlying process that is operating within the organization" is tenuous; behavioral output does not necessarily reveal the operation of the core forces in the model (such as standard operating procedures, search, and organizational learning). Any one of numerous alternative models (bureaucratic politics within the organization, groupthink, rational choice, etc.) could account for the behavioral output.

cess model have produced a significant amount of stimulating research. The final example of inquiry from an internal or intra-unit perspective involves the construction of inclusive frameworks and the derivation of hypotheses from the analytical scheme.

Such grand frameworks tend to be both comprehensive and cumbersome. The major example is the Snyder group's (1962) decision-making framework, which has been applied to the Korean War and Cuban missile crisis cases (Paige, 1968, 1972). The framework emphasizes the organizational, informational, and normative (decision value) clusters of variables.

Framework architects construct impressive edifices and "consumers" then conduct single or comparative case studies. From the applications are extracted propositions, such as the relationships which Paige (1972) unearths between crisis behavior and:

- The predominance of small, ad hoc decisional units;
- A taboo against explicit general consideration of domestic political ramifications of the preferred course of action.

While the Snyder framework contains internal and external variable domains, the substantive research has concentrated upon the former cluster. More recently, Brecher (1977c) has discussed the relevance of his comprehensive framework to research on crisis and other decision-making processes. Three typologies are at the center of the analytical scheme:

- Dimensions of crisis;
- Attributes of crisis actors;
- Characteristics of crisis decisional units.

The framework itself features the concepts of foreign policy system, input, process, output, operational environment, communication network, psychological environment, attitudinal prism, image, issue areas, formulation, implementation, and feedback. The actual research design focuses on the independent variables -- perception of threat, time, and probability of war -- and the dependent variable of crisis behavior (including the decision process and choice behavior).

After a series of case studies has been employed to generate propositions about the strength of association between the three independent variables and various facets of crisis behavior, the derived hypotheses can be used as sources of statements in a theory-system. Research is currently being conducted on numerous crisis cases between 1938 and 1976 (see Brecher, 1977c, 1979). Brecher (1977c: 60) explicitly locates his framework orientation in the interstitial space between "atomic empiricism" and "pure model-building."

Research in which dyadic and higher units of analysis are the objects of investigation falls within the inter-unit or interaction/systemic tradition. Here are contained a number of theoretical perspectives and models, including rational choice models, game theory, communications theory, the stimulus-response model, negotiation and bargaining theory, and systems theory.

Many interaction analyses implicitly or explicitly introduce the rationality postulates of game theory and other variants of decision theory (see Tanter, 1975). The participating actors are "black boxed" and are treated as unitary, rational, utility-maximizing decision-makers. A "rational" dyad will attempt to balance bilateral competition (and coercive bargaining) with shared danger (and disaster avoidance); Williams (1976: 29) identifies this as the essence of contemporary crisis management.

Pure decision theory is fundamentally normative in its depiction of an ideal state of affairs in which individuals are perfectly rational decision-makers. The assumptions about the actor's ability to order alternative outcomes, consistently choose the more preferred option, and maximize utility posit an ideal-type model of decision-making which is never manifested empirically. Although no model or theory achieves an exact fit with reality, the question of the empirical relevance of rational choice models and decision theory has been a continuing source of controversy (see, e.g., Almond and Genco, 1977: 508-509).

More recently, decision theory analysts have shown more interest in the subject of empirical decision-making characteristics. A recent review of research in behavioral decision theory contains the following summary:

> The major advance in descriptive research over the last five years has been the discovery that people systematically violate the principles of rational decision making when judging probabilities, making predictions, or otherwise attempting to cope with probabilistic tasks. Biases in judgments of uncertain events are often large and difficult to eliminate. The source of these biases can be traced to various heuristics or mental strategies that people use to process information [Slovic et al., 1976: ii].

The interest in empirical analyses of violations of rational decision principles and the concomitant identification of heuristics for information processing augur well for the realm of applied analysis. However, the obstacles to data-making are at least as problematic as the classical criticisms about the relevance of the rationality assumption and the operational problems of attempting to measure the subjective utilities and probabilities of decision-makers.

In the long run, this emphasis on empirical patterns may also yield payoffs for theory development. While O. Young (1972) and others properly warn theorists against excessive "descriptivism," the premature construction of abstract, highly simplified, closed models and theories is a sin in the other direction. Excessively abstract, simplistic, overly "rational" rational choice models may be irrelevant to the reality of decision-making. A viable theory may abstract away much of the substantive complexity of the real world, but a theory is not viable if it is an extreme caricature of reality; a balance between empirical relevance and theoretical parsimony must be sought.

The field of decision theory is a potentially fruitful source of theories of crisis decision processes. While rationality assumptions and cost calculation models have been prolific in the literature, the transfer to crisis analysis has been partial, ad hoc, and primarily for illustrative purposes. An example of the latter is Snyder's (1972) "credibility-critical risk" model.[31]

The stimulus-response model has also been prominent in interaction research on crises. Hermann and Brady (1972) describe this as the hostile interaction model; Tanter (1972: 9) refers to the event/interaction and Richardson process models as recurring event sequence models which allow for a non-rationality assumption. That is, in contrast with the rationality premise of game theory and the irrational (misperception) possibilities of the mediated stimulus-response model, the simple action-reaction model is not inconsistent with a non-rational, automatic interpretation. The extreme interaction point of view, in fact, totally excludes internal influences and processes; two actors simply exchange actions. The structure of the situation and reinforcememt over time function in a closed, deterministic model fashion.

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[31]See also Snyder and Diesing (1977: 48-52).

The applicability of the stimulus-response model to crisis behavior and to general processes of escalation and deescalation is obvious. While a mechanistic sent-received matching process is an egregious oversimplification of reality, there may be forces which are lockstitched into the fabric of crisis dynamics that propel the adversaries forward to a potentially disastrous crisis peak.

This stimulus-response process may be especially characteristic of certain types of crises, when, for example, the international system is in a state of flux and power relationships are changing dramatically. An historical case may be Europe after 1900, with Japan's victory in the Russo-Japanese War, the rise of Germany, the decline of the Ottoman Empire, and the occurrence of various other changes. Rapidly shifting capabilities and perceptions, hardening alliance configurations, and other forces may create a curious combination of uncertainty and determinism. What eventuates is a crisis slide -- into war and disaster.[32]

Most decision-making research has been descriptive; crisis management research has been primarily prescriptive. Theoretical islands and fragments of theoretical statements are discernible, however. If existing inquiry becomes more focused and more synthetic, the possibilities for theoretical progress are excellent.

The state of research on crisis abatement and resolution is less encouraging. The quantitative work has been almost exclusively descriptive in nature; examples include Azar (1972) and McClelland (1968, 1972). Quantitative indicators are often employed to define crisis periods and determine abatement.

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[32]Bell (1971: 14) discusses crisis slides. Among these are the 1936-1939 and 1906-1914 periods; 1948-1950 was close to a crisis slide, according to Bell.

The absence of a comprehensive, theoretically-based typology of crisis phases or stages has inhibited the construction of a theory of crisis abatement. Substantive and applied foci have directed research and analysis to the subjects of crisis warning, forecasting, and management; consequently, the empirical base and conceptual foundations for exploring, describing, and explaining crisis resolution are weak.

5.3.4 The Consequences of Crisis. Research on the consequences of crisis has been limited to characterizations of the process itself and to immediate post-crisis effects. Robinson (1972: 33-34), for example, catalogues such consequences as undesirable behavior, violence potential, functional effects, agenda setting, and bypassing bureaucratic lethargy. In terms of both theory and policy, equally relevant is the subject of long-term consequences of crisis.

As opposed to the prevailing narrow-gauged focus on crisis resolution, several crisis analysts have viewed crises as independent variables. Hermann (1972b: 12) contrasts the competing hypotheses that crises increase or decrease the probability of war. The latter is attributed to experience-routinization and/or substitution-for-war processes.

Snyder and Diesing (1977: 20) clearly distinguish between the crisis outcome (war or resolution) and what they label aftermath effects. Among the latter are effects on the relative power between the actors, effects in reducing or increasing conflicts of interest, effects on alignments, and emotional effects. However, inquiry on crisis consequences has generally been circumscribed; "systemic" analysts tend to restrict their focus to a dyad or a subsystem. A dynamic view of international political relations would direct inquiry to all phases of the crisis process -- ranging from the determinants of crises to crises as determinants of other phenomena.

5.4 Conclusion: A Balance Sheet

The overall assessment of research and theory in the domain of international crisis analysis involves four summary generalizations concerning judgments about cumulativeness, the status of research activities which are not explicitly or directly theoretical, the question of "policy relevance," and suggested directions for future inquiry. Prior to discussing these issues, we should note that our evaluation has been primarily negative because the criteria for assessment are unusually exacting. Given the standard philosophy of social science definition of theory as a deductively connected set of primary and derived statements, the only possible conclusion is that crisis research is in a pre-theoretical or theoretically primitive state.

There is increasing evidence of cumulativeness in crisis research, although the progress has been sporadic and ad hoc. Evidence of both cumulation and integration is discernible, although the synthesis of findings and explanations from different levels of analysis remains a distant goal. To the extent that cumulative research exists, it is limited primarily to the interiors of the competing theoretical edifices.

The most sustained progress has occurred in the domains of conceptual development, data base generation, and methodology. Crisis researchers have employed all of the basic methods of social scientific inquiry, including case studies, comparative case studies, cross-national quantitative analysis, and "experimentation" (e.g., simulations). Such pioneers as North and his colleagues (1963) and McClelland (1968, 1972) have demonstrated the utility of such data generating techniques as content analysis and international events data. A survey of crisis methodology would range from simulation and gaming to interviews to regression to other

forms of statistical analysis. Methodological eclecticism and innovation are reflected in recent applied inquiry; forecasting techniques based on Bayesian statistical estimation and Markov chains (see Duncan, 1977; Duncan and Job, 1978) and the application of the "robust" philosophy of parameter estimation of multi-equation models in the context of long-range forecasting (see Werbos and Titus, 1978) are among the pertinent examples.

At the outset of this assessment, we offered the judgment that non-theoretical research activity is of value. Innovative methodological research can be viewed in terms of this argument. Like "basic" or theoretical inquiry, purely methodological research is both high-risk in nature and long-term in its payoffs. The value of method-oriented research is that an error term or a bias (error variance) is presumably associated with any method; convergences among findings from very different methods increase our confidence in the results (Milburn, 1969: 271).

O. Young (1972: 187-190) points out that there is a variety of non-theoretical activities which researchers can pursue. Among these are sensitization, conceptualization, factual assessment, simple generalization, correction, and extrapolation. As Young concludes:

> Each of these activities represents a significant alternative (or supplement) to the construction of viable theories. Various mechanisms of snobbism have prevented these other activities from acquiring the prestige often associated with theory. They do not offer the predictive and (sometimes) manipulative power of viable theories. And nothing anyone can do, especially in the realm of verbal status seeking, will turn any of these activities into serious endeavors. Let me repeat, however, that these activities are important and worthwhile. They offer the most useful results that policy makers dealing with international problems are likely to get from outsiders in the immediate future [1972: 190].

Examples of each of these non-theoretical activities can be gleaned from the crisis research literature. Sensitization -- the emphasis of concepts, questions, facts, and points of view that have previously been neglected -- is exemplified by the argument that crisis may not be totally non-functional and may pose an opportunity as well as a threat (Robinson, 1972: 270).

A crisis may be functional by focusing attention on the issue at the vortex of the dispute and by producing a genuine settlement. The consistently discovered curvilinear relationship between stress and such outcomes as creativity and decision-making performance suggests that a crisis which does not produce a debilitating level of stress and anxiety may be beneficial in its effects. A crisis may be viewed as an opportunity -- from the perspective of a decision-maker who skillfully and unscrupulously exploits the situation (Hitler in 1938) as well as for policy-makers who use a crisis to resolve potentially disastrous conflicts (Kennedy and Khrushchev in 1962). Researchers should be sensitized to recognize that crises are not invariably pathological and dysfunctional.

As Young (1972: 188) notes in his discussion of conceptualization activities, each individual has a conceptual framework or view-of-the-world, even if the framework is disjointed and unarticulated. Examples in international crisis research are typified by the decision-making and systemic "frameworks." As Young points out, many research traditions highlight specific analytic and substantive presuppositions and normative orientations and reflect (and expose) dominant cultural biases.

Factual assessment can aid policy-makers. The study of crisis management patterns and trends is an example of this kind of research. For example, there has been a shift to more

domestic crises and away from predominantly military disputes (Hazlewood et al., 1977: 88). Such factual assessments have implications for crisis management planning and resource allocation.

Simple generalizations are often useful even if they lack explanatory value. In crisis analysis, McClelland (1972) reports that volume and variety indicators both increase appreciably at the onset of a crisis. This empirical finding has since been converted to a simple generalization and has provided the basis for the Early Warning and Monitoring System Project's development of quantitative, event-based crisis indicators (see Andriole, 1976; Daly and Davies, 1978).

The identification of simple generalizations which are erroneous -- the process of correction -- is an endeavor which need not be theoretical. For example, the unitary, rational actor model black boxes internal decision processes and treats all actors as simplified utility-maximizers and probability-estimators. The counter-hypothesis that decision systems exhibit significant variation suggests that black boxing assumptions may be incorrect (see Bobrow et al., 1977, 1979). If heterogeneity characterizes the processes of defining and perceiving crises, then it may be necessary to develop system-specific decision rules.

Extrapolation or trend persistence views the future as a linear continuation of the past. While Young (1972: 190) offers the valid caveat that the phenomena of interest in international political analysis rarely conform to this assumption, quite a few of the forecasting efforts in international relations and crisis analysis have been based upon the trend persistence assumption. Analyses of deviant cases -- when a stimulus-response sequence is interrupted, for example -- are extremely useful in the context of an overarching extrapolation premise.

While the focus of this assessment is the status of theoretical activity in international crisis analysis, the question of the nature of the nexus between crisis research and the real world will be dealt with briefly. In recent years, political science has exhibited a renewed concern with policy relevance.[33] Government-supported international relations research has become significantly more applied in nature (see, e.g., CACI, 1977).[34] Many discussions of theory assert that the latter improves the quality and delivery time of applied or "engineering" products; Bobrow (1972: 217), for example, contends that a deductive theory "provides initial focus on what are the important considerations and on what are the consequences of their relationships."

Bobrow (1972: 217) and O. Young (1972: 202) both emphasize that theorists should focus primarily on theoretical research activity without being concerned about relevance. The payoffs of theory, then, are very long-run in nature. If a deductive theory of crisis is possible (at some unspecified future point in the fairly distant future), it would be relevant to policy-makers.

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[33]From the academic vantage point, the "dialogue" between the research community and the state has involved more hortatory rhetoric than concrete contributions. Reams of paper have been exhausted in an effort to ascertain the nature and scope of "policy relevance." The impact of the post-behavioral revolution is reflected in the recent call for the development of a global monitoring system (Snyder et al., 1976).

[34]The literature here is voluminous and primarily unpublished; several examples are included in the special issue of International Studies Quarterly on crisis analysis (R. Young, 1977). On the question of "relevant" crisis research, see Bobrow and Phillips (1976) and Hermann (1975). See also Section 1.1 above (pp. 1-5).

The issue of prospects for abstract, deductive theory cannot be given adequate treatment here.[35] Recent critics have charged that behavioral political science has suffered from its apotheosis of the hard sciences as a model and an isomorphic analogy (see, e.g., Almond and Genco, 1977). Central to this critique is the attack on the deductive-nomological model of explanation and the physical science view of causality as the search for general laws which account for particular events. Almond and Genco (1977: 522) define political science as "the analysis of choice in the context of constraints." The complexities of human behavior cannot be accounted for by a set of laws: lawful relationships "will not explain social outcomes, but only some of the conditions affecting those outcomes [Almond and Genco, 1977: 493; emphasis added]."

In evaluating the potential relationships between theory and action, we view the former as an endeavor which occupies a position midway between a nostrum and a magic panacea. Scientific theory would help the policy analyst and the policy-maker, but it would not solve every problem. In fact, theory may be least useful for the most critical choice processes. Williams (1976: 150) refers to the "point of no escape" as the stage of critical escalation in a crisis; he notes that the point varies from crisis to crisis and is inescapably uncertain in nature. The uncertainty can never be totally eliminated. In the Almond and Genco scheme, constraints (i.e., theoretically relevant phenomena) and ineluctably unique choice processes interact to produce behavior.

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[35] Related to this is the debate about relative versus universal statements (see Phillips, 1974: 164). A deductive, universal theory is undoubtedly beyond the scope of political sciece. See Almond and Genco (1977: 493, 513) on political generalizations as "soft" regularities and the problem of decaying generalizations. For an excellent specific example, see Sanders' (1978) critique of the Hibbs (1973) study of internal violence.

Future crisis research should concentrate on the goal of integration. Theoretical perspectives from different levels of analysis may be most productively viewed as converging streams rather than competitive frameworks. A synthesis of decision-making, rational decision, and bargaining theories (e.g., Synder and Diesing, 1977), for example, could provide the basis for plausible substantive and -- perhaps eventually -- valid scientific theories of crisis.

Cautious optimism infuses our overall assessment. Cumulativeness has occurred -- albeit in an ad hoc and additive fashion. Precursors of theoretical activity have been pursued vigorously and sometimes successfully. Progress in conceptualization, data collection, and methodology is discernible. Perhaps the single most important goal for the future is to anchor crisis analysis in a more general international relations matrix. Crisis is, as Snyder (1972: 217) expresses it, international politics in microcosm. In this sense, the emergence of an "autonomous" field of crisis analysis is regrettable. A viable theory of international behavior would simultaneously be a viable theory of crisis behavior.

6.0 DEVELOPMENT AND TESTING OF INTEGRATED CRISIS WARNING MODELS

The development of integrated crisis warning models constitutes a significant component of the CNCI Project's research agenda. Figure 1-9 (p. 16) demonstrates that work on interstate and domestic crisis models represents the foundation of the Project. Integral to this concern is the indicator specification and development process; equally central is the search for linkages between interstate and intrastate crises.

6.1 Interrelationships and Models

The latter focus has elicited the attentions of a number of researchers. As was noted earlier in the discussion of the intrastate indicator system, the phenomenon of intrastate crisis has rarely been operationalized directly. Internal crises can therefore be treated only in the context of data sets which measure domestic conflict behavior.

Crisis analysts have traditionally trichotomized their focus of inquiry on a temporal basis in terms of the pre-crisis phase, the crisis per se, and the post-crisis period. The crisis is viewed as a deviation from normal patterns of behavior. These time frames direct analysis to three distinct aspects of crisis research. Crisis warning (anticipation and avoidance) comprises the first stage. Crisis management research involves scrutiny of the behavioral and decision process phenomena which characterize the crisis phase of the sequence. Crisis resolution refers to the analysis of the post-crisis period and the return to some form of normality in behavior.

The trilogy of crisis warning, management, and resolution would obviously also apply to cross-national, intrastate political research. From a linkage politics perspective, the use of "crisis" as the central focus yields nine possible foreign-domestic "interaction points" (see Figure 6-1).

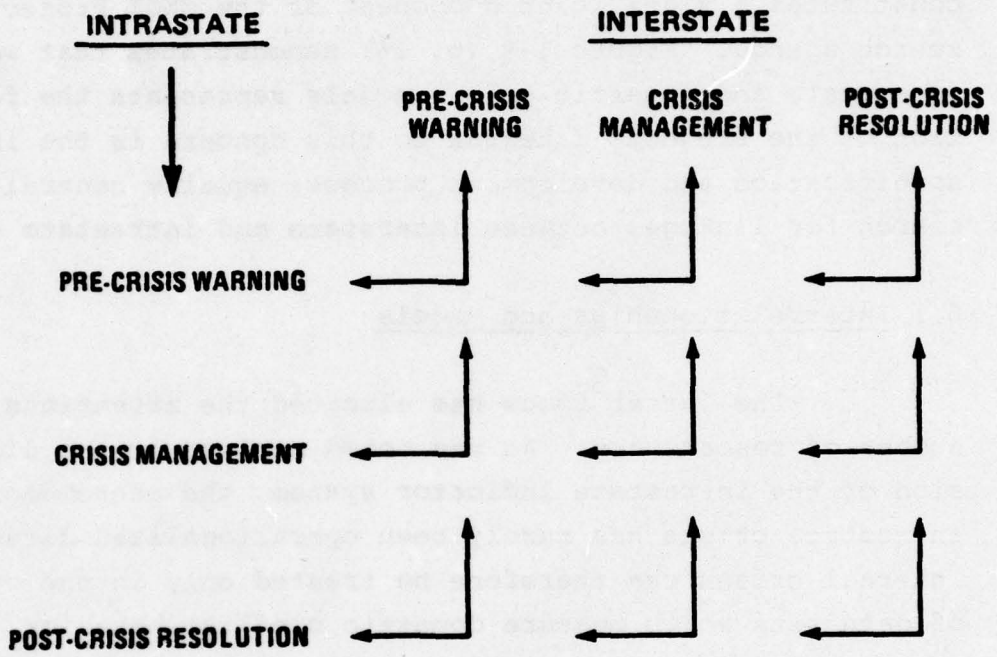

FIGURE 6-1
Interstate and Intrastate Crisis Linkages

Pre-crisis phases at both the state and interstate levels may converge, leading ultimately to crises at one or both levels of warning. Crises which occur simultaneously within the state and in the external arena may have profound consequences for both sets of management tasks. Pre- or post-crisis stages at one level would perhaps create distinctive management patterns for a crisis at the other level; alternately, crisis management may affect crisis development or resolution at the other level.

Finally, post-crisis phases at both the intrastate and interstate levels may have ramifications for the dual resolution processes.

6.1.1 Determinants of Internal Violence and Instability.[1] Before the implications of Figure 6-1 are pursued in detail, it is necessary to consider the entire spectrum of determinants of internal unrest and conflict. These range from macrosocietal structural conditions to microscopic precipitants. The case study and cross-national literature on the etiology of intrasocietal turmoil and violence is extraordinarily heterogeneous and prolific. Hibbs (1973) and Muller (1977) provide examples of quantitative, cross-national inquiry in this area. The standard conceptual scheme for structuring research on democratic participation also applies to the domestic conflict or "aggressive participation" realm. Figure 6-2 portrays the typical linear, recursive model.

Considerable work is available on such remote macro-level or structural determinants of intrasocietal unrest as economic development. The major example is the Hibbs (1973) causal analysis of a variety of potential structural sources of mass political violence.[2] Among the predictor variables are:

- Level of economic development;
- Rate of change in socioeconomic development;
- Social structural imbalances (imbalances in education or urbanization and economic development);

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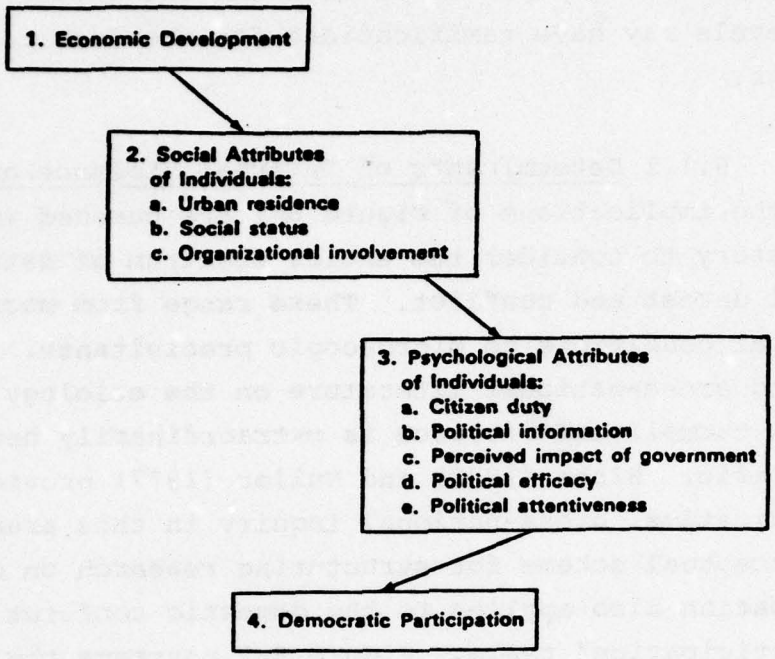
[1]As noted, research has concentrated on internal conflict rather than crisis per se. References here to domestic, internal, and intrasocietal should be treated as equivalent; similarly, terms such as "domestic conflict," "instability," "political violence," "internal unrest," and "civil strife," are used synonymously.

[2]See Sanders (1978) for a critique of Hibbs (1973).



[a]Source: Muller (1977: 66).

Figure 6-2

THE PARTICIPATION MODEL[a]

- Social mobilization, government performance, and social welfare;
- Sociocultural differentiation (ethnolinguistic fractionalization, group discrimination, political separatism);
- Political system characteristics (democratization, regime type, political influence of the communist and non-communist left).

Other examples include Hudson (1970), who assesses the impact of "environmental" influences (social modernization and homogeneity of political culture) and institutionalization (differentiation and durability of political structures) as well as Jacobson (1973a), who examines the structural level

forces of structural complexity, coerciveness, and system performance. Both analyses are cross-sectional (circa 1965); Hudson (1970) examines 63 countries and Jacobson (1973a) 75.

More intensive research has been conducted in the economic domain. In addition to the Hibbs (1973) study, Parvin (1973) estimates the effects of an array of economic indicators (cross-sectional data from 26 countries of different regions) while Sigelman and Simpson (1977) present findings for personal income inequality and several other economic and sociocultural aggregate indicators (also cross-sectional, for a sample of 49 nations).

Aside from some of the economic variables, most of the findings in the system-level or structural area indicate that such factors exert little direct impact (at least given current measurement approaches and capabilities). For example, Hudson (1970) concludes that cultural fragmentation does not show a linear relationship to domestic violence and that institutionalization does not predict stability. Jacobson (1973a: 76) establishes the rank order of importance of determinants as: support (measured by factors which are seen as responsible for fluctuation in "support" inputs); system performance (system response capabilities); demands (tapped by measures of increase in the number and kinds of demands being articulated); coerciveness; and structural complexity.

Parvin (1973) accounts for 67 percent of the variance in political unrest with six economic determinants: per capita income; income distribution; per capita income growth; socioeconomic mobility; communication intensity; and urbanization. Sigelman and Simpson (1977) isolate the effects of personal income inequality; the Gini index of personal income inequality and population size accounted for almost 22 percent of the

variance in internal war. The linearity of the relationship is clearly established and, moreover, this impact is shown to be uninfluenced by potential suppressor variables (such as ethnolinguistic heterogeneity and rate of urbanization). The importance of GNP per capita is revealed, providing support for Parvin (1973). Generally, level of economic development exerts no direct influence on civil strife; the rate of economic growth displays a moderate nexus (inverse linear in form) with internal violence (Hibbs, 1973; Muller, 1977: 74).

Various relationships between the other two predictor realms in Figure 6-2 -- intermediate micro factors (social attributes) and immediate micro phenomena (psychological attributes) -- and intrasocietal conflict have been reported. In fact, the best known theoretical frameworks in the literature, such as the work of the Feierabends and Gurr (see Feierabend and Feierabend, 1966; Feierabend et al., 1972; Gurr 1968a, 1968b, 1970), emphasizes such psychological and social psychological concepts as frustration and relative deprivation.

Two problems have surfaced here, however. One is that the objects of investigation are rarely measured directly but are generally inferred from aggregate or system-level data.[3] The second problem is that the empirical results have been inconclusive and, overall, are far from supportive (see Grofman and Muller, 1972 and Muller, 1972). However, Muller (1977: 75) reports that a proper operationalization of the concept yielded encouraging results in a West German survey study of mass political violence; relative deprivation was linearly and positively

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[3]This shortcoming is being rectified. Muller (1977) refers to Barnes and Kaase's cross-national survey research on domestic and aggressive participation and provides an overview of findings from his own empirical work on West German attitudes and behaviors regarding aggressive participation.

associated with aggressive participation.[4] Muller's West German project has yielded impressive empirical results:

> With only utilitarian incentive in the prediction equation, the explained variance in Aggressive Participation reached a level of 23%; when personal normative incentive was added, the amount of explained variation in Aggressive Participation rose to 45%; and when the presence of favorable social norms, along with an individual's availability for collective action of any kind...were included in the prediction equation, 57% of the variance in Aggressive Participation was accounted for - a satisfyingly high level of predictive accuracy given that the variables were measured at the micro level and that the model was tested across a very large and heterogeneous sample of persons [Muller, 1977: 77].

Insufficient research has accrued to offer definitive generalizations about the determinants of domestic conflict (not to mention the more amorphous concept of domestic crisis).[5] However, several summary propositions can be advanced. First of all, it is possible to monitor and -- at least to an extent -- forecast domestic conflict and cooperation (see Slater and Orloski, 1978). Secondly, a viable model of internal unrest and crisis will involve a synthesis of remote, macrocosmic, structural, system-level determinants and immediate, micro-level social psychological and psychological phenomena (at both the elite and mass levels). A variety of motivational and attitudinal precursors should be measured. Among the more prominent of these are utilitarian justification and normative incentive for aggression, social norms, political alienation, dissatisfaction with policy performance, personal value priorities, and level of ideological conceptualization (Muller, 1977).

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[4]However, the influence of relative deprivation on aggressive participation is mediated by other variables (Muller, 1977).

[5]See p. 81 for an exploratory discussion of models of intrastate crisis.

6.1.2 Internal and External Crisis Linkages. The possibility that there is a nexus between internal and external conflict behavior has been supported by intuitively plausible reasoning and by sociological conflict theory. In empirical research, the relationship between domestic conflict behavior and foreign conflict behavior has been examined from a variety of methodological perspectives.[6] The linkage has also been measured in varying regional arenas and cross-national contexts.[7]

The early work (Rummel, 1963; Tanter, 1966) showed that there is virtually no relationship between internal and foreign conflict. On the basis of historical data, Denton (1966) concluded that there is a positive relationship. Wilkenfeld (1968) demonstrated that the relationship is moderately strong when type of state is taken into account.

More recently, Kegley et al. (1978) reaffirmed the importance of considering the intervening variable cluster of type of nation. In a test using militarization (military expenditures as a percentage of GNP), the correlation with internal conflict (Gurr's civil strife data for 1961 to 1965) is .15 and the correlation with foreign conflict (WEIS data, 1966 to 1969) is .24. When regimes are classified by level of military expenditures, the following results emerge:

- There is a small positive relationship between domestic and foreign conflict for nations in the low militarization category;
- There is almost no relationship for countries in the medium category;

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[6]See the following representative studies: Hazlewood (1973, 1975); Rummel (1963); Tanter (1966); Wilkenfeld (1973); Zinnes and Wilkenfeld (1972).

[7]See, e.g., Burrowes and Spector (1973); Collins (1973); Liao (1976); Stohl (1975); Wilkenfeld (1975); and Wilkenfeld et al. (1972).

- There is an inverse relationship of considerable magnitude (r = -.49) for countries in the high militarization group (Middle East and Communist nations);
- The large majority of the cases fall into the first two categories.

Some attention has also been given to the question of the linkage between war and domestic political violence. Stohl (1975) uses an interrupted time series quasi-experimental design to examine the war involvement-domestic level changes-domestic conflict sequences. The dependent variables are the type and extent of internal political violence; the introduction of war leads to a search for differences between pre- and post-test slopes and intercepts. For all five major U.S. wars since the 1890's, Stohl discovers that war exerts a significant (but substantively variable) impact on patterns of internal unrest and violence.

In addition to the extensive work on the domestic disorder/foreign conflict relationship, efforts have been made to probe the nexus between internal instability and foreign intervention. Weede (1978) postulates a causal chain involving:

general societal weakness ➤ domestic disorder ➤ passive conflict participation (being a target of foreign military intervention).

The dependent variable is U.S. military intervention in support of the regime. The independent variables include: indicators of domestic violence; coup-proneness (measured by irregular executive transfers and unsuccessful attempts to overthrow the government); U.S. aid (total economic, per capita economic, and military); material well-being (GNP per capita and physicians per capita); and size of the population. In multiple regression analysis, the independent factors collec-

tively explain 41 percent of the variance; the key determinant is domestic disorder.[8]

One attempt to refine the study of internal and external conflict linkages involves longitudinal case studies of Lebanese and Syrian behavior patterns (1948-1973). In this study, Sloan (1977) emphasizes that a linkage exists, but only when specific dyads and issue areas are considered. For example, the domestic-foreign conflict correlation for Lebanon is .49. The corresponding correlations for the dyad-specific relationships involving Egypt and Syria are .95 and .73 respectively; when UAR and Syrian links are controlled, the overall r is reduced to .23. (The corresponding correlation for the Lebanese-Israel dyad is -.03.) Sloan's issue analysis reveals that the relationships increase during domestic crisis periods and that the key issue is one involving Lebanese national integrity.[9]

The most charitable judgment would be that this stream of inquiry has yielded inconclusive results. Few of the researchers have discerned a nexus of any real magnitude between internal and external conflict; furthermore, the supportive research generally accounts for only a small portion of the measurable variance in foreign conflict behavior.[10]

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[8]Interestingly, the U.S. aid relationship is weak and indirect; Weede (1978) concludes that the U.S. aid policy represents a response primarily to perceived target needs.

[9]Similar findings characterize the Syria case.

[10]The differences in the various studies compound the difficulties of interpretation; Sloan (1977) and Scolnick (1974) note such differences as noncomparable hypotheses, varying conceptualizations, operational criteria, and data bases, universal versus dyadic analyses, the presence or absence of time lags, nonequivalent time periods, and different statistical and analytical techniques. See Scolnick (1974) and Stein (1976) for reviews and critiques of this literature.

The overall assessment of the state of research in this area is that the potential nexus has never been illuminated properly because the internal domain has almost invariably been reduced to a domestic conflict events file. The result has been an inescapably truncated perspective on the nature of the internal realm of conflict and crisis. It is obvious that internal "stress" and "crisis" cannot be measured adequately with discrete domestic conflict event indicators.

Suggestive evidence can be gleaned from initial results which were generated by McClelland's D-files approach (see McClelland et al., 1976: 32-38). The conceptualization there pertains to the relationship between international and domestic "threats" rather than to conflict or crisis per se. DDV data, which is the product of a coding scheme that is applied to dangers files data,[11] were used to explore the relationship between international and domestic threats.

In a comparison of serious domestic and international threats over time, there was an inverse relationship between the number of such domestic and international threats over weekly intervals (McClelland et al., 1976: 33). More convincing was the finding that the basic inverse relationship also appeared when three day intervals were employed (McClelland et al., 1976: 34).

This pattern pertains to a four month period (January to April of 1976) and obviously cannot constitute the basis for a verified generalization. It does, however, suggest that a less restrictive approach to the task of developing intrastate indicators may yield payoffs. If there is an inverse relationship between internal stress and external crises, this finding

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[11]"DDV" is an acronym for "danger, disaster, violence;" DDV coding is one technique which can be applied to dangers file data (McClelland et al., 1976: 14).

would be of inestimable value to both theorists and policy analysts.

The process of specifying the internal-external nexus should also consider the various linkages that may exist. As Scolnick (1974: 503) notes in his appraisal of research on the relationship between domestic and international conflict:

> At least two models are needed, one concerning the effects of domestic strife on external conflict, and the second focusing on how external conflict affects domestic strife. There is no reason to think that the processes involved in one will be the same in the other. Moreover, both types of models should deal with the mechanism by which one form of conflict affects the other: a simple stimulus-response model will not suffice.

The "raw empiricism" which has typified research on the linkage between intrastate and interstate conflict should be abandoned in favor of an approach which involves the construction of models that specify the expected relationships. The combination of a more comprehensive, creative conceptualization of the domestic milieu with the articulation of testable models which are analyzed longitudinally represents a productive route to the derivation of more conclusive evidence about the hypothesized relationship.

6.2. The Action-Reaction Model

One of the most primordial of the underlying relationships which has been unearthed by students of conflict at all levels of analysis is that conflict-begets-conflict. During the contract year, we conducted further research on the action-reaction perspective which constitutes a primary model for analyses of international crisis behavior. The background research and preliminary analytical results will be briefly chronicled here.

6.2.1 The Partial Least Squares (PLS) Technique.[12] Previously referred to as NIPALS (Nonlinear Iterative Partial Least Squares), the PLS (Partial Least Squares) technique is an analytical strategy which has been developed by Hermann Wold of the Department of Statistics at the University of Uppsala in Sweden.[13] PLS is designed specifically for situations of complexity and low prior information; interdisciplinary research problems are especially susceptible to PLS treatment. Typically, multidisciplinary problems are complex (featuring a plethora of variables and relationships) and the prior insight is low.

Figure 6-3 provides an overview of statistical methods for analyzing complex problems. To the left are situations of low prior insight; descriptive methods predominate here. To the right are methods which require higher degrees of insight.

Wold (1978b) equates explanation with causal and/or predictive explanation. He points out that with Jan Tinbergen's multirelational models in the middle and late 1930's, a new era in quantitative economics was launched. After World War II, the interaction of modern mathematical statistics and computer-based analysis ushered in a new phase in macroeconomic model building. The new approach -- simultaneous equations systems -- includes Tinbergen's models as a special case (causal chain systems); the general case is called interdependent systems. Causal chain systems can be consistently estimated by Ordinary Least Squares (OLS) regression; for the estimation of interdependent systems, an array of new methods was developed, with special attention being paid to Maximum Likelihood (ML) estimation.

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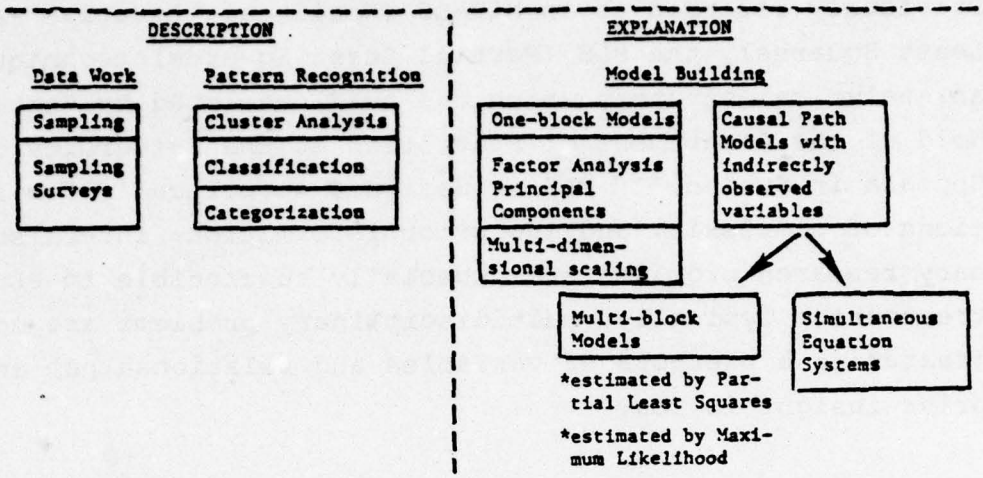
[12] This section is based on Wold (1978a, 1978b).

[13] See also Wold (1975a, 1975b, 1977a, 1977b, 1977c) and Hui (1978). Dr. Wold is currently Visiting Professor in the Department of Econometrics at the University of Geneva.



[a]Source: Adapted from Wold (1978b: 2).

Figure 6-3

PARTIAL LEAST SQUARES IN THE CONTEXT OF METHODS FOR ANALYZING COMPLEX PROBLEMS[a]

The simultaneous equations systems in econometrics are causal-predictive. In sociology, similar explanatory models are referred to as path models, a term borrowed from the field of genetics (Wright, 1934). Both designs encompass situations where all of the variables are directly observed or manifest.

Path models with latent (indirectly observed) variables originated in sociology in the early 1960's (see Duncan, 1966). Joreskog (1973) has developed path models with latent variables, using his LISREL version of the method of estimation; Wold (1975a, 1975b, 1977a, 1977b, 1977c) employs PLS estimation to develop such models. The PLS approach to path models with latent variables can be referred to as "soft modeling," occupying a position between the "hard" assumptions of traditional

model building and data-oriented approaches. "Soft" PLS models are primarily intended for complex problems where prior information is scarce.[14]

Methodological details are provided in Wold (1978a, 1978b) and in Appendix E of this study. Conceptually, the design of a PLS model is provided by its arrow scheme. Figure 6-4 depicts two examples; one involves the recurring question of home background versus school conditions as determinants of student achievement (see Noonan and Wold, 1977) while the other is a four-block model which posits that economic levels and social conditions influence political conditions which in turn shape economic growth rates (see Adelman et al., 1975).

The arrow scheme involves manifest (directly observed) variables, which are depicted as squares, and latent (indirectly observed) variables, which are shown in Figure 6-4 as circles. Analytical complexity is reduced by treating blocks of observables as the structural units of the model. Each block is assumed to have a block structure by which the manifest variables are linear indicators of a latent variable; the latter is estimated as a weighted aggregate of the indicators.

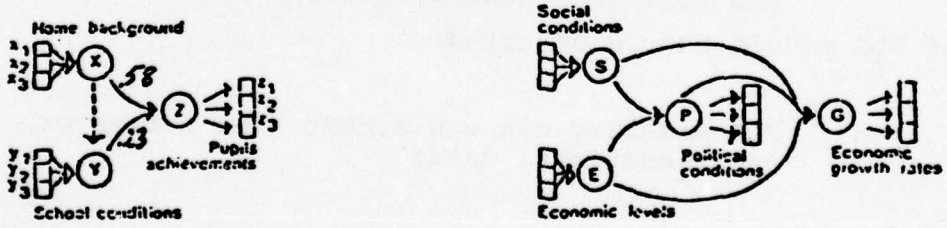


Figure 6-4
EXAMPLES OF PLS MODELS WITH LATENT VARIABLES

[14]Specifically, path models and PLS are ideal for two types of situations: when available theories are lists of probable causal variables (or variable clusters) for some set of dependent variables and when knowledge of the statistical distributional properties of relevant variables is incomplete or lacking.

The arrows of the scheme -- singly or in bundles -- characterize the model's structural relations. The model has weight relations for the weights of the indicators in the estimated latent variables. The model also features inner relations among the latent variables and outer relations -- directed either inwards or outwards -- between the latent variables and their indicators. For each block where the latent variable is explained by an inner relation, the model provides causal-predictive relations for the observables in that block, generating predictions in terms of weighted aggregates of the explanatory blocks of indicators.

The inner relations are the causal-predictive core of the model. The arrow scheme posits no direct relations between the observables. This is consistent with the fact that PLS models are designed for problems characterized by low degrees of prior knowledge; the model builder specifies structural relations between the blocks, not between the discrete manifest variables.[15] Although PLS models posit no direct relations between the manifest variables, the model does provide causal-predictive relations for the manifest variables in terms of other manifest variables.

The following generalizations about the implementation of PLS models should be noted:

- PLS modeling can use either time series or cross-sectional data;

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[15]This is consistent with the emphasis in comparative foreign policy on clusters of determinants (internal and external factors, psychological and role domains, etc.); such clusters were treated in the IBA framework as components (see Andriole et al., 1975 and above, pp. 28-29). See also Figure 2-3 (p. 25), which depicts the Rosenau (1966) pre-theory and Figure 2-4 (p. 26), which portrays the CREON (East et al., 1978) model.

- The structural relations are derived directly from the arrow scheme on the basis of two extremum principles:
  - * Maximize the correlation between latent variables that are directly connected by an inner relation;
  - * Minimize the residual variances of the inner relations and the causal-predictive relations;
- PLS model estimation is an iterative procedure that may be called "instant estimation" in the sense that it operates directly on the posited structural relations of the model;
- PLS model estimation yields numerical coefficients for the various structural relations and numerical case values for the latent variables. The procedure is called Partial Least Squares estimation because the structural relations are estimated by OLS, with each regression generating estimates for a subset of the unknowns to be estimated;
- The interpretation of latent variables and inner relations is the same as for OLS regression results. For example, the (x) ➔ (z) coefficient in Figure 6-4(a) is .58 and the (y) ➔ (z) coefficient is .23; the former .58 indicates the expected increase in student achievement levels if the background variable increases by 1 unit, while the school conditions variable remains constant.

The PLS approach has been applied in an impressive number of contexts. In addition to the work summarized in the following section on foreign policy, PLS models have been developed for a variety of complex, interdisciplinary problems. The first-generation three- or four-block models have been succeeded by models of from five to 17 blocks. Table 6-1 lists the applications in various social and natural science fields.

Dependent Variable	Independent Variables	No. of Blocks in PLS Model	Discipline(s)	Investigator(s)
Student Achievement	Home background	3	Education	R. Noonan et al. (1975)
	School conditions		Sociology	R. Noonan et al. (1977)
	Same	3	Sociology	R. Noonan & H. Wold (1977)
	More detailed grouping	17	Sociology	R. Noonan & H. Wold (1978)
Political Conditions	Economic levels	3	Economics	I. Adelman et al. (1975)
	Social conditions		Sociology	
			Political Science	
Economic Growth	Economic levels	4	Economics	I. Adelman et al. (1975)
	Social conditions		Sociology	H. Apel (1978)
	Political conditions		Political Science	H. Wold (1978)
Government Investment	Economic Activity	3-5	Economics	H. Apel (1977)
	Pollution		Environmental Science	
Student Achievement	Attitudes of students	4	Education	B. S. Hui (1978)
	Expectations of parents		Psychology	A. Boardman et al. (1978)
	Expectations of peers		"	A. Boardman et al. (1978)
	Home & school conditions	17	"	B. S. Hui (1978)
Student Achievement	Expectations of parents	4-17	"	B. S. Hui (1978)
	Expectations of peers		"	
	Home & school conditions		"	
Water Pollution	Water pollution (upstream)	2-5	Chemistry Limnology	D. L. Duever, B. R. Kowalski and H. Wold (1978)
Cancer Treatment	Molecular pattern of medical treatment	2	Chemistry Medicine	W. Dunn and H. Wold (1978)

Dependent Variable	Independent Variables	No. of Blocks in PLS Model	Discipline(s)	Investigator(s)
Economic Sanctions	Sender's conditions Receiver's conditions Sender-receiver relations Receiver's foreign support	2-5	Peace Research Political Science	H. Wold (1978)
Foreign Policy Behavior	Societal factors Interstate factors Global factors	3-4	Political Science International Relations	P. Rossa, G. W. Hopple, and J. Wilkenfeld (1979) J. Wilkenfeld et al. (1979)

Table 6-1

APPLICATIONS OF THE PLS APPROACH TO PATH MODELS WITH LATENT VARIABLES

6.2.2 Results.[16] In order to identify the indicators which warrant more detailed scrutiny in terms of their potential for crisis warning, we undertook the task of assessing the relative potencies of indicator sets. The sets are defined by cluster or component: psychological; societal; interstate; and global realms in the operationalized framework. The purpose of the data analysis is twofold:

- To identify the component(s) which contain the most potent indicators for explaining foreign policy behavior;
- To pinpoint the specific indicators within that component which appears to be the most fruitful.

This goal, combined with an analysis of the effects of the mediating nation typology, shaped the initial data analysis goal.

In the current analysis, four latent variables are defined.[17] The global, interstate, and societal components represent three latent independent variables. The foreign behavior realm constitutes the fourth dependent latent varibale. Each latent variable is defined as a weighted interaction of its manifest indicators, where weights are determined as estimated parameters in the model. Figure 6-5 depicts the generalized model.

Figure 6-6 provides a graphic representation of the PLS model which is used in our analysis. Three latent independent variables are specified: global; interstate; and societal.

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[16]This section is based on Rossa et al. (1979).

[17]The psychological component was analyzed separately, since the decison-maker value data constitute a subsample of the total sample of states. Multiple regression results for the psychological, societal, interstate, and global indicator domains are reported in Hopple (1979).

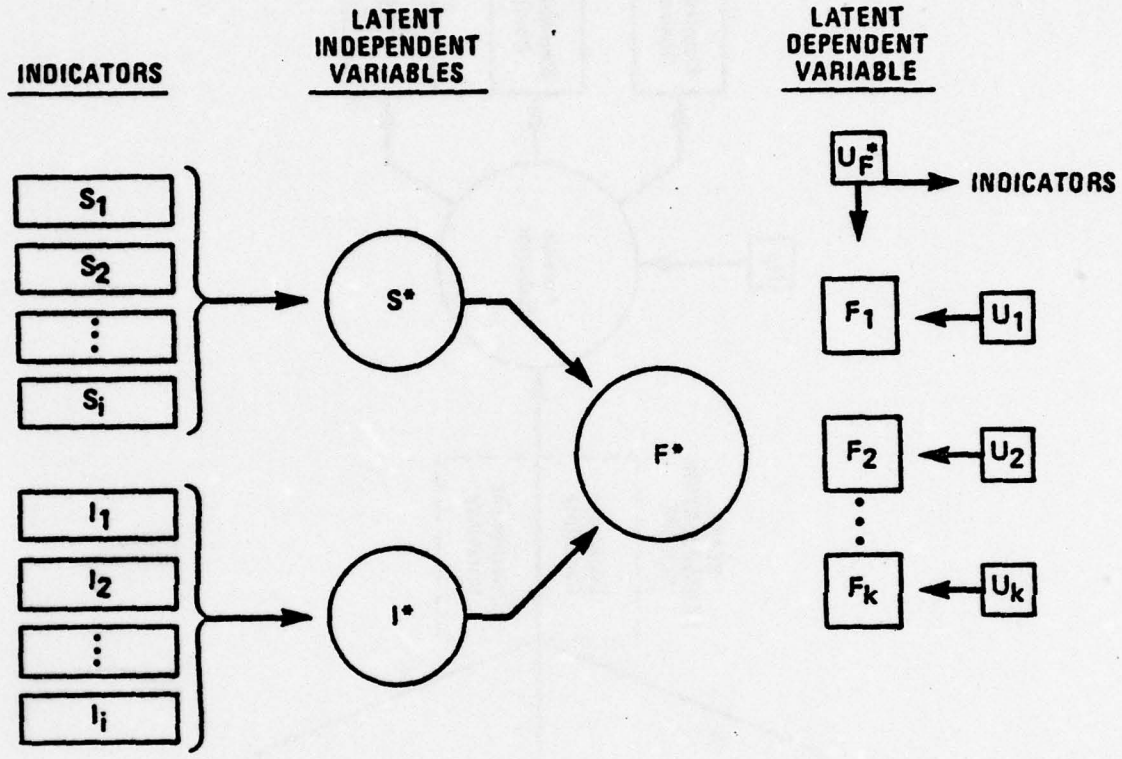

FIGURE 6-5

Generalized PLS Model

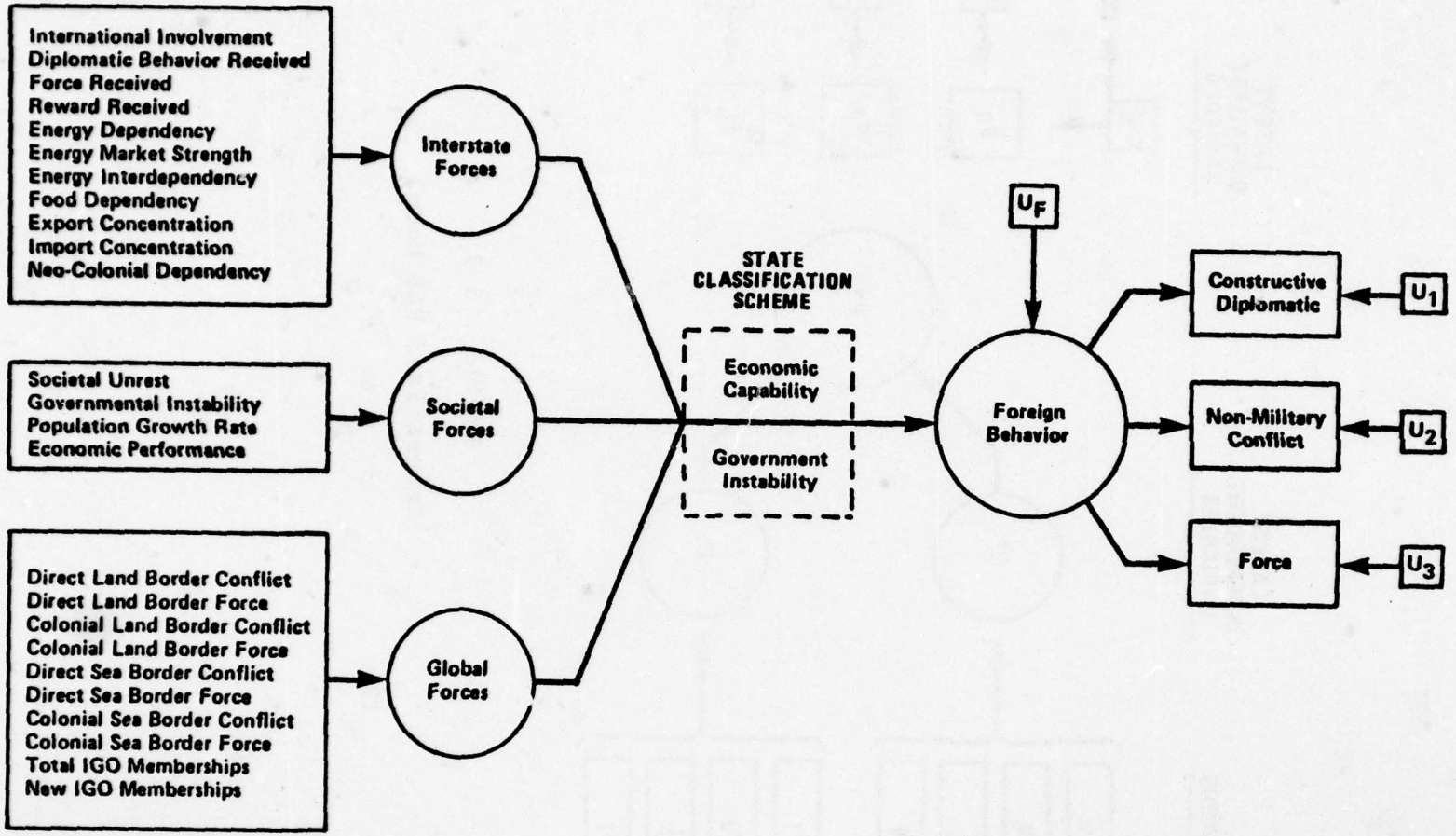

Figure 6-6

PLS MODEL APPLIED TO CNCI INDICATORS

Each is composed of a block of operationalized indicators. The latent dependent variable, foreign behavior, reflects the three measures of foreign activity. In addition, typological control is employed; Appendix E discusses the technique of control, which assumes interaction among the four state typological dimensions and allows mediated and unmediated effects of the manifest variabels.

Figure 6-7 presents the results of the model test.[18] Eight iterations were required before stable results were obtained. For each manifest variable, two weights (betas) are reported: the direct weight and the weight attached to the variable when typological control is imposed. Relative potency scores (betas) for the latent independent variables provide direct measures of the effects upon foreign behavior of the variable blocks. In the model, 94 percent of the variance in foreign behavior is explained. Constructive diplomatic behavior is best explained; the force result is the least impressive, although the latter is nevertheless explained rather well.

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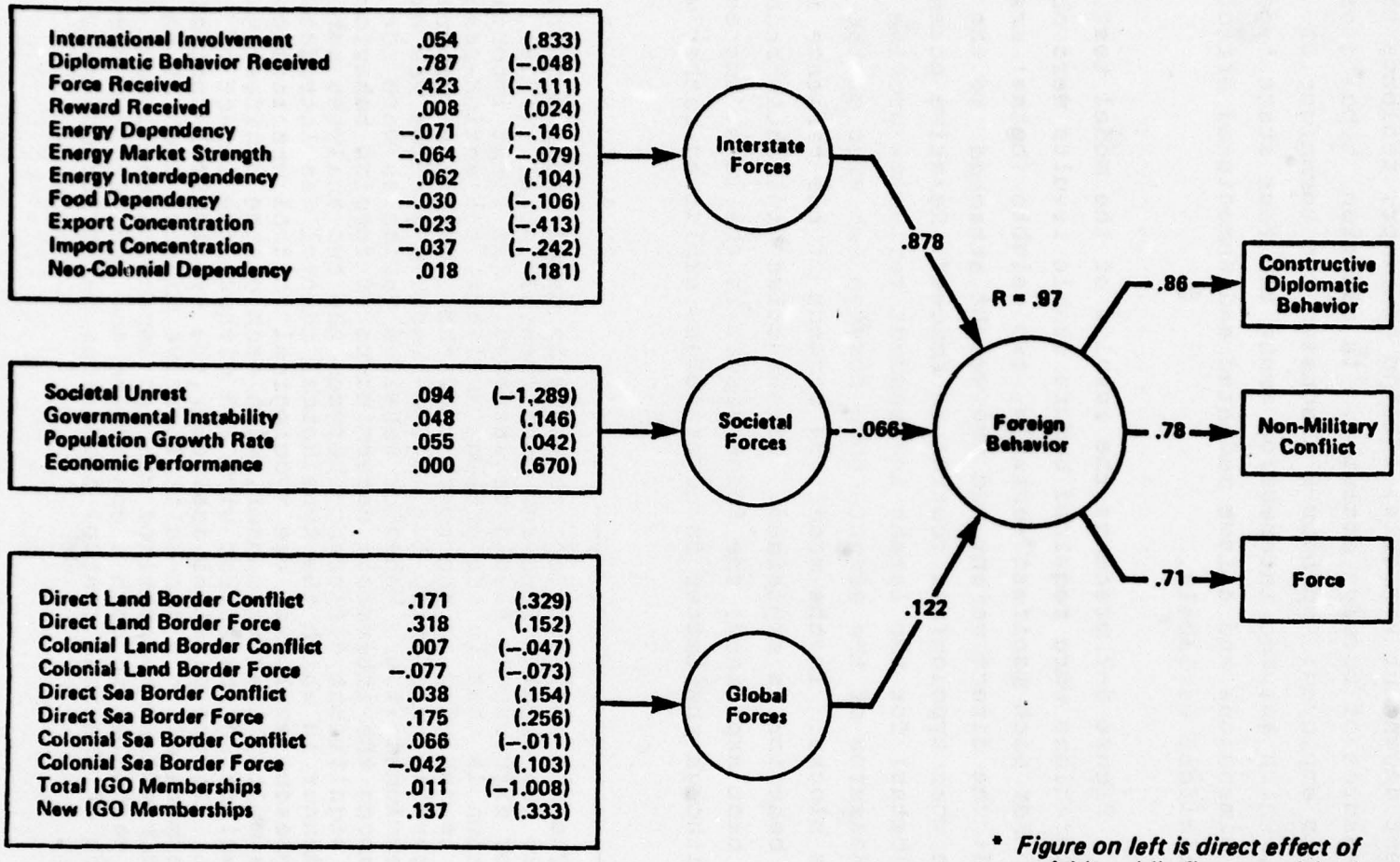
[18]The PLS analysis reported here is parallel in some respects to the results reported in Wilkenfeld et al. (1979), but the major differences should be stressed. The first important distinction is that in the present analysis, the action-reaction element is included in the context of the interstate component. In the parallel analysis, the action-reaction portion was explicitly excluded (i.e., behavior received variables were not included among the interstate determinants of foreign behavior). Another significant difference between the two analyses pertains to the manner in which the typological control was introduced. In the present analysis, the typological control was incorporated in a multiplicative manner, with each of the manifest variables exhibiting its effect with and without the impact of type of state. In the parallel analysis, the typological control was incorporated in a non-multiplicative manner; each of the latent variables was examined via its impact on the latent dependent variable, in both a controlled and uncontrolled form, with each of the four control dimensions being introduced separately.



* *Figure on left is direct effect of variable, while figure on right, in parentheses, indicates the beta as mediated by the state typology.*

Figure 6-7

RESULTS OF PLS ANALYSIS: INTERSTATE, SOCIETAL, AND GLOBAL COMPONENTS*

The results clearly demonstrate the centrality of the interstate component in accounting for foreign behavior; the societal domain is obviously the least potent. The overwhelming importance of the interstate factor is of crucial significance here; this finding indicates that the "core" set of variables should be sought in this area.

Within the interstate component, two variables are weighted very strongly and virtually dominate the block of variables: diplomatic behavior and force received. The direct (unmediated) effects of these two variables are much stronger than their mediated effects. Moreover, both are derived from the interstate component; rewards received, however, exerts little if any impact.

Two other potent variables within the interstate realm are international involvement (total merchandise trade) and export sector concentration. Both of these variables display mediated effects and are of limited relevance in the absence of the imposition of the typological control. The other six indicators of interstate economics have small effects, and these are generally mediated by type of state.

These results suggest that the reception of diplomatic and force behavior provides the most straightforward and potent explanation of foreign behavior patterns. When the control for the typological dimensions of states is taken into account, we discover that various interstate economic indicators, especially export sector dependency and international economic involvement, exert influence. The typological control is also important with the less powerful global and societal components.

The overall summary generalization is that the reception of behavior is directly and strongly linked to foreign policy action whereas other indicators exert various levels of

influence depending upon state characteristics; behavioral stimuli constitute universal determinants of action while other forces vary in impact by state-type. This conclusion has been affirmed in previous research (Wilkenfeld, 1973, 1972; Zinnes and Wilkenfeld, 1971; Hopple et al., 1977b).

This finding is open to some question, since the use of the WEIS data base for operationalizing both behavior received and behavior sent may bias the results. As McCauley (1977) points out, bias in news coverage may seriously affect parameter estimation and artificially inflate such relationships, overestimating the potency, in this case, of behavior received indicators. Burgess and Lawton (1972: 64) allude to the special problems of WEIS data in this regard.

A more troublesome criticism of this finding concerns the issue of aggregation. Because the "behavior sent" and "behavior received" indicators aggregate events which occur during a period of one year, it is impossible to state unequivocally that the events "received" occurred prior to the events "sent" by the state. A causal influence can therefore not be established in a definitive sense. Moreover, if event-causes-event sequences are assumed by the interaction model, the results reported above do not provide support for the thesis.

The problem cannot be dismissed, but it may be reinterpreted. Only when the action-reaction model is viewed from a discrete event perspective does the problem become unmanagable. If the indices tap behavior which underlies the observed events, and if the behavior is perceived as important while events per se are relegated to an indicator role, then this criticism is no more applicable to the indices than it is to transactions (e.g., trade) data (Rossa, 1977). While this argument mitigates against the critic, it neither resolves the basic issue (for trade data may also be suspect!) nor satisfies those who are

concerned with time-frames. At this point, we assume that the problem of causal sequence is difficult, yet -- in terms of the continuous reality perspective -- not overwhelming.

The PLS model yields results which offer support for hypotheses which link non-WEIS-related variables to foreign behavior. These are generally dependent upon the state and its structural characteristics and therefore are not universal relationships. Nevertheless, their presence or absence is nomothetically determined within the model. Perhaps the stimulus-response model, even when its impact is possibly exaggerated as a result of data bias intrusions, may serve as a generalization of behavioral activity -- subject to the admittedly idiosyncratic but neverthless important effects of various other factors.

The findings of the relative potency tests generated by the PLS model reveal both the universal importance of diplomatic and force behavior stimuli in the determination of foreign policy behavior and the variability of other explanatory factors. Here we shall discuss this "action-reaction" model as a "core" system of indicators of interstate crises. We shall also present some preliminary findings regarding the interrelationships of these indicators.

We have selected the action-reaction model as a core system of our indicator set for two reasons. First, the model appears to contain universal parameters which are not dependent upon state characteristics and are of impressive potency. As "potent universal" relationships, the linkages among the indicators comprise a sound and relatively uncomplicated system. Without any loss of explanatory ability, type-of-state characteristics may temporarily be ignored when the frame of reference is the action-reaction model.

The second justification for selecting this as the core system is the popularity of the model. Action-reaction,

stimulus-response, and behavior-begets-behavior hypotheses pervade international relations theory and research. The model has been directly tested by some researchers (e.g., Holsti et al., 1968), while others posit action-reaction sequences to be the explicit background context of their research (e.g., Gamson and Modigliani, 1971) or treat such sequences as the immediate determinants which are supplemented by more subtle processes (Choucri and North, 1974).

The relative potency tests established general relationships between each of the three indicators of behavioral stimuli and "foreign behavior" as a composite latent variable. Here, we shall explore -- in a very preliminary fashion -- the nature of the relationships which characterize each of the three forms of behavior sent. In particular, we are interested in the effects of each "stimulus" indicator upon each "response" variable. The most direct method of ascertaining these relationships is through multiple regression analysis. The following results were obtained for the 56 states in the sample for the years 1966-1970 (N = 280); betas and F-values are reported (see Table 6-2).

Constructive Diplomatic Behavior = .97 Diplomatic Behavior F = (2248)	.08 Reward (14.0)	−.10 Force (21.7)	R = .95 F = 913
Non-Military Conflict Behavior = .54 Diplomatic Behavior F = (10.4)	.05 Reward (1.01)	.17 Force (114.8)	R = .66 F = 70.75
Force = .013 Diplomatic Behavior F = (3.3)	−.05 Reward (44.7)	1.01 Force (16668.)	R = .99 F = 7621

**N = 280 (56 states, years 1966–1970).*

Table 6-2

MULTIPLE REGRESSION RESULTS: BEHAVIOR SENT*

These results suggest that the "core" indicators of our interstate crisis warning system hold strong promise. Over 90 percent of the variance in constructive diplomatic and force behavior is explained by the respective equations and a not insignificant proportion of conflict behavior is also explained. This improves upon the PLS model, which contained more variables but allowed less specificity.[19]

The parameters in the equations are noteworthy. Constructive diplomatic behavior is most strongly determined by the reception of diplomatic (and ambiguous) activity; the reception of force tends to reduce constructive behavior, while the reception of rewards has the opposite effect. Force behavior is largely determined in a stimulus-response fashion by force received; ambiguous messages have some positive influence upon forceful behavior while rewards tend to reduce force. Conflict behavior is most affected by diplomatic actions received and is increased by force received; rewards have little influence upon conflict behavior. A substantial amount of conflict behavior is determined by factors which are not included in the model. Ambiguous stimuli (diplomatic behavior) result in a variety of responses, while force and rewards exhibit positive and negative effects.

A more detailed inspection of these results reveals two major processes within the indicator system.[20] First, we

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[19]The three equations were also estimated annually (N = 56; five separate estimates). The results varied yearly; the reported parameters,however, represent approximations to these fluctuating estimates. Subsequent analysis will employ varying time aggregations and lags.

[20]The ensuing discussion may stretch the findings beyond their limitations, given the preliminary nature of the analysis. It is assumed, for purposes of speculative discussion and extrapolation, that the findings approximate real world processes and extend to dyadic analyses.

may refer to a "force spiral" in which the state engages in mutual force exchanges which tend to spiral upwards. Force reduces constructive behavior, which includes the dampening effects of rewards; it increases (by a large magnitude) conflict behavior, which will be received as diplomatic actions tending to increase conflict.

Secondly, the parameters suggest an "amity spiral" characterized by increasing constructive behavior and decreasing force. Constructive behavior, received as diplomatic and reward stimuli, fosters both constructive behavior and, to a lesser extent, conflictual behavior. Increases in conflict and constructive action are outweighed by the mollifying effects of rewards upon force behavior, which, when reduced, further spur constructive action and retard conflict and force.

A noteworthy gap in the indicator system is indicated by the failure to explain 57 percent of the variance in non-military conflict behavior. The action-reaction model must be supplemented to account for this form of behavior. To the extent that the spirals described above occur, conflict sent operates to control the dynamics: large increases in conflict behavior (attributable to variables excluded from this model) would exacerbate a force spiral or reverse the opposite, while decreases might have a comparable impact and dampen force exchanges or spur more constructive interaction. Conflict behavior plays a pivotal role in the "spiral" scenarios.

6.3 A Research Agenda: Models for Crisis Warning

Work is continuing on various models of crisis behavior.[21] Three potential crisis models will be discussed in

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[21]The EWAMS staff at IPPRC will conduct research on decaying memory and other models. The action-reaction model is also attracting continuing interest; see Gillespie and Zinnes (1978).

this section: preconditions vs. precipitants; status inconsistency and aggression; and diffusion and contagion. The first two will be treated in a very cursory fashion.

One proposition which can be posited to be central to crisis model-building involves the crucial distinction between preconditions of crises (those factors which can be viewed as the basic underlying determinants of crises) and precipitants -- or immediate precursors. Eckstein (1965) originally developed and applied this distinction to the study of internal war.

A viable indicator system will include both preconditions (i.e., static attributes) and an array of precipitants (i.e., dynamic indicators). While the latter may be more amenable to decision-maker intervention, both types are important for crisis explanation and prediction.

Models of foreign conflict and crisis behavior could be structured around the notions of status inconsistency and aggression. This corpus of theory, following the pioneering work of Johan Galtung (1964), postulates that aggression is most likely to originate in social positions which are in states of rank-disequilibrium. Depending upon the unit of analysis under consideration, this aggression will manifest itself in the form of crime, revolution, or war (or crisis).

The notion of rank disequilibrium can be integrated into a comprehensive analytical scheme in the form of relational considerations. Thus, the structural attributes utilized in the development of the classificatory scheme of foreign policy actors would be employed in this context as relational attributes.[22]

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[22] On the attributes scheme, see Section 3.6.1 above (pp. 110-112).

Each state would be scored on each status dimension. Furthermore, it would be advisable to provide country status rankings on both the global and regional levels, in order to assess most accurately the impact of perceived status inconsistency on external conflict and crisis behavior. Since data exist for 77 countries for 10 years (1966-1975), appropriate empirical tests could be devised and implemented.

A considerable amount of theoretical and empirical work has been done across a variety of disciplines on the phenomena of diffusion and contagion.[23] Domestic violence has been analyzed in terms of diffusion and contagion effects (see Midlarsky, 1978 and Pitcher et al., 1978). Coups or domestic military intervention incidents have been posited to be the result of contagion or processes of cue-taking from the international environment (see Li and Thompson, 1975; Laemmle, 1977; Putnam, 1967; Midlarsky, 1970). In addition to the contagion of coups across systems, the spread of international violence (war) has also been studied from a contagion/diffusion perspective (see, e.g., Midlarsky, 1975).[24]

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[23]The diffusion of innovations has been the object of investigation in anthropology, rural and medical sociology, education, and other fields since the 1930's; Lin (1973: 160-176) summarizes this work. The diffusion of policy innovations across American states has been studied in political science; see, e.g., Gray (1973). On the general issue of "Galton's problem" and diffusion as a possible genuine causal force, see Warwick (1978).

[24]The precursor of this work is Richardson (1960), who developed a mood theory of war, providing a quantitative picture of war moods in Great Britain and Germany immediately before, during, and after World War I. Note the critical differences between diffusion processes which assume direct contact (cultural diffusion, "epidemics" of fads, rumors, etc.) and those which do not (coups, war, etc.); see Pitcher et al. (1978) for details.

Like epidemics, fads, rumors, internal strife, and conflict and wars, internationcal crises are phenomena which could be susceptible to a contagion or diffusion process. A model of crisis contagion or diffusion could provide the foundation for an applied science of crisis epidemiology.

Midlarsky (1978) emphasizes in his study of U.S. urban riots in the 1960's that there are two types of diffusion processes:

- The spread of a particular phenomenon as the result of the cumulative impact of a set of statistically independent events;
- Contagion or a hierarchical process which involves "imitation" or direct modeling.

In the first class, each precipitating incident (interaction between police and blacks in the case of urban riots) is independent but results in a similar outcome which is proportionate to previous disorders. A lognormal distribution to analyze overdispersion phenomena attributable to diffusion processes is applicable.

The second set of cases involves a hierarchical principle. Specifically in the urban disorder instance, the frequency of disorders in smaller cities increases when a larger, more visible city experiences the phenomenon; the large city functions as an "exemplar" and smaller cities become susceptible to direct modeling or contagion.

Much of the past work has focused on contagion per se and has assumed a hierarchical pattern. For example, hierarchies of wealth or modernization or diplomatic status have been posited in empirical studies of the diffusion of such phenomena as innovations (across American states) or instability in Latin America

(see, respectively, Gray [1973] and Walker [1969] and Midlarsky [1970] and Li and Thompson [1975]). The second type, then, may characterize the diffusion of interstate crises.

Also plausible, however, is the first type as a model for capturing the dynamics of crisis outbreaks. The precipitating incident(s) may be structurally isomorphic across crisis cases but independent, while the statistical profile conforms to the assumptions of the proportionate effect diffusion process model: the series of disorders expands over time via a mechanism in which <u>each addition disorder increment is proportional to the existing size of the process</u> (Midlarsky, 1978: 998).

Research on the diffusion of innovations has concentrated on two distinct levels of analysis: the aggregate diffusion rate over time and the individual adoption process.[25] Most of the research indicates that the rate tends to be S-shaped, beginning slowly, increasing with a gradually accelerating rate, and finally tailing off slowly again. One of the earliest of the empirical diffusion studies -- Pemberton's (1936, 1937) study of the adoption of the postage stamp in independent European and North and South American countries -- revealed such an S-shaped curve (see Figure 6-8). This S-shaped diffusion pattern also characterizes other cases.[26]

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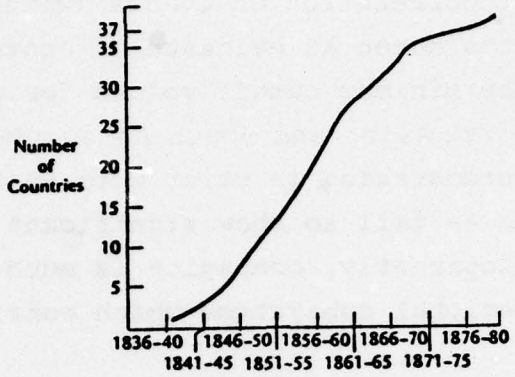
[25]This paragraph is based on Lin (1973).

[26]However, the early finding that the cumulative diffusion rate approaches or approximates the normal curve has not always been confirmed (see Lin, 1973: 171-173). In cases when the cumulative curve deviates from the normal curve, the extent of deviation can generally be accounted for. Significantly, one of the key factors is the extent of interaction among the (adopting) units within the system. The normal curve is based on the premise that the events occur independently of each other; this does not apply to active as opposed to isolated doctors in the diffusion of medical innovations, for example. Analogously, a normal curve should not characterize the cumulative diffusion rate of international crises and the deviation should be especially marked for active as opposed to "isolated" nations.



[a]Source: Lin (1973: 163).

Figure 6-8

CUMULATIVE DISTRIBUTION OF POSTAGE ADOPTION IN EUROPE AND NORTH AMERICA, 1836-1880[a]

Studies of the spread of innovations at the individual level have frequently uncovered attitudinal, pscyhological, and social characteristics which clearly distinguish between earlier and later adopters. Presumably, the tendency of nations to be susceptible to the diffusion of crises will also be marked by the presence of differentiating attributes.

Laemmle's (1977) diffusion study of domestic military intervention provides a pertinent analogue here. Using the contagious binomial rather than the contagious Poisson (because of the paucity of data points), Laemmle investigates two levels of contagion of domestic military intervention:

- The influence of the international system per se;
- The impact within regional subsystems.

The data clearly demonstrate that contagion is present in the international system. When the successful domestic military intervention events are disaggregated into eight regional subsystems, the presence of contagion is unequivocally established in some subsystems. When the distributions are tested for the

presence of autocorrelation of events (with high serial correlation coefficients taken as evidence of contagion), only three regions meet the minimum cutoff values for significance: North/West Africa; North Asia; and South Asia. The two regions most associated with contagion in prior work -- Latin America and Central America -- fail to show significant levels of serial correlation. Apparently, contagion is much more likely to occur within regional subsystems which consists of newer nations.

Nations with shorter histories, in other words, are more prone to emulate successful domestic military intervention efforts. Analogously, it is plausible to suggest that newer nations will be more likely to show diffusion effects for crisis behavior than older countries which have been able to acquire independent traditions of crisis involvement. Thus, crisis diffusion may show a hierarchical effect and the patterns here may be comparable to research which shows that individuals in social systems "adopt" an innovation at different rates as a result of varying characteristics. Laemmle uses data on coups for the time frame from 1948 to 1967; the availability of several international crisis data sets (described above in Chapter 4, p. 134) would permit a similar test for the distribution and spread of crises between nations.

6.4 Beyond Conjecture?

The models which are sketched out above can be developed in more detail and tested. The CNCI data base contains data which, in conjunction with certain other data sets such as WEIS, could be used to test and refine models of action-reaction processes, preconditions (static contextual indicators) versus precipitants (dynamic precursors), status inconsistency

and crisis/conflict phenomena, and diffusion.[27]

Dynamic event monitoring and warning and methodological and technological innovation are dominant features of the contemporary crisis analysis terrain; the landscape is less "filled in" in the realm of crisis models (and theories). It is this agenda which poses the critical challenge for the next "wave" of inquiry -- for future basic and applied research endeavors.

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[27]The CNCI borders data could be used as a "first-cut" approach to ascertaining the presence of diffusion effects. A panel scheduled for the 1979 International Studies Association Meeting ("The Origin of Diffusion of Conflict and Violence") illustrates the continuing interest in this phenomenon.

7.0 CONCLUSIONS

Recent literature reviews document the content and scope of crisis analysis.[1] The conceptual, empirical, and methodological aspects of crisis research display an impressive amount of high quality output. The work of Brecher (1977c, 1979) and his colleagues[2] and the recent study by Snyder and Diesing (1977) both reflect the case study approach at its best. The field continues to be theoretically primitive, but even here there is evidence of some progress.

However, the international system is in a state of flux; the lenses for perceiving and structuring reality undoubtedly require modification. This theme was foreshadowed in McClelland's (1977) assessment of the state of the field in the special issue of International Studies Quarterly. More recently, Tanter (1978: 342) has emphasized that as detente supersedes the cold war system and the superpowers begin to pursue a strategy of conflict avoidance, the crisis axis may shift from an East-West to a North-South basis.

Dominant assumptions and images, however, are anchored in the context of high level, superpower crises such as the Cuban missile crisis. The relative neglect of other crisis arenas is becoming less and less defensible. Recent events in the Horn of Africa and elsewhere on that continent -- as well as recurring internecine disputes involving China, the Soviet Union, and the Communist powers of Southeast Asia -- suggest that Third World crises have become both more visible and more dangerous to order and peace.

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[1] See especially Hopple and Rossa (1979) and Tanter (1978).

[2] See the Special Issue ("Studies in Crisis Behavior") of the Jerusalem Journal of International Relations (Winter-Spring, 1978).

This fact has all kinds of implications for crisis analysis. For example, it implies that economic factors should be monitored more systematically; it also poses a need -- at least from the U.S. perspective -- for more focused and detailed analyses of the whole realm of "second-order crises."[3] But it also raises a much more fundamental question: are the frameworks and approaches of the bipolar era as irrelevant now as the spiral model in the Europe of 1914 was to the (implicit) deterrence model which prevailed in 1938 and 1939?

Clearly, the forecasting methodologies and data bases of the Crisis Management Program remain relevant to the tasks of anticipating crises and tracking international affairs. However, the frameworks, models, and conceptual lenses require constant evaluation and modification. Much of the impetus for this process is the outgrowth of striking changes and shifting emphases in international "reality."

The continuing need to develop and refine models and theories is also dictated by the nature of social science inquiry. Political scientists and others who study crisis warning or management generally work within the boundaries of research nuclei or clusters. The bifurcation into decision-making/intra-unit versus systemic/interunit schools provides a graphic illustration of this pervasive tendency.

Evidence of "crossing" levels of analysis is rare.[4] Even less common are studies which attempt to effect a genuine

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[3]Bobrow et al.(1979) provide a discussion of Chinese decision rules for policy-making with respect to the subject of intervention in "second-order crises" (i.e., those in which the actor is initially uninvolved).

[4]A partial exception is Snyder and Diesing (1977).

integration or synthesis between the systemic and perceptual frames of reference. As Tanter (1978) emphasizes in his assessment of recent crisis literature in the areas of warning, decision-making, and management, a system or interactional perspective cannot account for all instances of crisis. To explain processes which do not intensify gradually (i.e., cases of deception or very rapid escalation), it is necessary to introduce perception and intent (Tanter, 1978: 346). Mechanistic stimulus-response processes do not always operate; even when actors become locked into an action-reaction dynamic, however, it is still udeful to have subjective or perceptual data in order to refine the analysis. Factors ranging from the macrocosmic (the international system parameter) to the microcosmic (the perceptual processes, information processing, and decision-making behavior of the individual) interact in the matrix of crisis generation (anticipation/avoidance) and management.[5]

Proponents of the rational and cognitive perspectives have become enmeshed in debates about the relative validity of the two vantage points; the systemic school in crisis analysis posits a rational decision process (at least implicitly) while the intraunit or decision-making perspective often adopts

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[5]Snyder and Diesing (1977) repeatedly document the differences between the macro and micro perspectives. Crises (and conflict) can occur because of the ultimate contextual factor (the anarchy of the international supergame and the consequent security dilemma); crises do occur because of what transpires during strategic efforts in one or more of the core areas (acquiring armaments, forming alliances, acting against adversaries). Game theory is useful for describing the structure of the bargaining situation; decision theory (bounded rationality and bureaucratic politics models) is necessary for tracing and explaining the decision process (i.e., answering the question "how are bargaining strategies constructed and implemented?")

irrational or non-rational premises.[6] The extensive research which suggests that international crises are unusually susceptible to the impact of stress and other pathology-producing phenomena (see, e.g., Milburn, 1972 and Smart and Vertinsky, 1977) illustrates the compelling need for designs which integrate systemic, interactional, and perceptual levels of analysis.[7]

In an even more basic sense, a viable theory of international crisis will almost definitely be contained within a more general theory. In their masterful study, Snyder and Diesing (1977) launch this process by juxtaposing concepts from bargaining, decision-making, and international systems analysis. Both intergovernmental and intragovernmental (bureaucratic politics) bargaining processes are highlighted. Bargaining, in fact, emerges as the core concept; other factors can be viewed as special features of the bargaining process or as internal or external factors (the belief systems of decision-makers, the type of international system, etc.) which impinge upon or shape that process.

In their final chapter, Snyder and Diesing (1977) relate crisis theory to a more general theory of international political behavior.[8] Substantive detail is stripped away until

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[6]See especially Kinder and Weiss (1978) and Stein (1978); the cognitive literature on crisis and other contexts is assessed and abstracted in Hopple and Favin (1978).

[7]The rational model advocates simply black box the internal unit and thereby exorcise cognitive constraints. Interestingly, however, the cognitive school, as Kinder and Weiss (1978) emphasize, exposes the dangers of this black boxing but invariably turns to the analytic paradigm as a source of prescriptions; Kinder and Weiss (1978: 729) describe the discontinuity between prescription and description as "startling."

[8]Crisis has of course often been analyzed as a form of international conflict; on crisis management and coercive diplomacy, see Snyder and Diesing (1977) and Tanter (1978).

three fundamental structural concepts remain: the distribution of power within the international system and the national decision units and the values or preference structures which motivate state actors. A general theory of international politics will treat crises, conflictual processes generally, and war as phenomena which reflect and (along with other strategic pursuits, such as alliance building) shape the structure and content of bargaining processes.

The Cross-National Crisis Indicators Project has not directly contributed to the articulation of a genuine theory of crisis specifically or of international political behavior generally. The goals have been much more modest in nature. However, the assessment of crisis theories and the development of potential models have presumably provided at least one of the cornerstones for an eventual theoretical edifice in the domain of crisis analysis.

The completed research tasks of the CNCI Project include:

- The expansion of the state sample from 56 cases to a larger number of countries;
- The development of an intrastate indicator system;
- The development of an interstate indicator system;
- The collection of data for the intrastate and interstate systems;
- The updating of the state classification scheme;
- The assessment of theories of crisis;
- The illumination of the nexus between internal and external crises;
- The development and refinement of an action-reaction model of crisis behavior;
- The preliminary specification of other potential crisis models.

Appendix A
VARIABLES AND INDICES

This appendix reports the sources for the variables in the CNCI data base. Generally, the data are available for all 77 countries in the sample for 10 years (1966-1975).[1] Exceptions are explained in footnotes. Indices (scales and factors) are also listed when relevant.[2]

I. Psychological/Individual Indicators

A. Decision-Maker Values[3]

1. A comfortable life
2. A world of peace
3. Equality
4. Freedom
5. Happiness
6. Governmental security
7. Honor
8. Justice
9. National security
10. Public security
11. Respect
12. Social recognition
13. Wisdom
14. Progress
15. Unity
16. Ideology
17. Cooperation
18. Support of government

Sources: Foreign Broadcast Information Service Daily Report and U.S. Department of State Bulletin.

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[1] On the country list, see Section 3.2 above (pp. 51-57).

[2] The data are currently available at the CTO Demonstration and Development Facility (DDF) only in their "raw" form (i.e., scales and factors are not included).

[3] The 18 values are based in part on Rokeach's (1973) list of universal values. The data are available for varying state subsamples of the total sample of 77 for the years 1966-1970 only; the yearly country lists and related information are provided in Hopple (1977, 1978).

B. Elite Attributes
   1. Age
   2. Education
   3. Occupation

Source: Political Handbook and Atlas of the World, International Yearbook and Stateman's Who's Who, and International Who's Who.

II. Societal Indicators

A. Economic Performance
   1. Merchandise balance of payments

Source: International Monetary Fund, Balance of Payments Yearbook and Direction of Trade Annual.

   2. Percentage of unemployed

Source: United Nations, Statistical Yearbook (UNSY).

B. Demographic Situation
   1. Population growth rate

Source: UNSY.

C. Domestic Conflict (Variables)
   1. Assassinations
   2. General strikes
   3. Guerilla warfare
   4. Government crises
   5. Purges
   6. Riots
   7. Revolutions
   8. Anti-government demonstrations
   9. Number of coups
   10. Number of changes in the executive
   11. Number of changes in the cabinet
   12. Number of changes in the constitution

Source: Banks (1971).

D. Domestic Conflict (Scales)
   1. Governmental instability (C-5, C-7, C-9, C-10, C-11, C-12)
   2. Societal unrest (C-2, C-6, C-8)

III. Internal Situation Profile (ISP) Indicators[4]

A. Economic Indicators
1. Cost of living
2. Growth in national production
3. Unemployment
4. Inflation (consumer or wholesale price index)
5. Balance of payments
6. Interest rates
7. Currency exchange rate
8. International credit
9. Investment
10. Food prices
11. Resources
12. Recession or depression
13. Economic pact
14. Governmental intervention in economic sectors
15. Strike (labor-management conflict)

B. Social (Collective) Indicators
1. Medical health
2. Housing
3. Education
4. Welfare
5. Transportation
6. Crime
7. Nutrition
8. Natural disaster
9. Population change
10. Ecological problem
11. Boycott
12. Riot

C. Military Indicators
1. Arms or weapons procurement from abroad
2. Military manpower
3. Arms budget
4. Arms or weapons procurement from domestic sources
5. Defense pact
6. Arms control
7. Bases and installations; deployment (re-deployment of weapons)

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[4]Data are available only for three years (1966, 1970, 1975) for 7 of the 77 countries (Peru, France, USSR, Zaire, Egypt, India, Philippines).

D. Governmental Indicators

1. Illegal executive change: revolution (mass-based)
2. Illegal executive change: coup (elite-based)
3. Legal executive change: unscheduled (death, early election)
4. Legal executive change: scheduled (election, end of term)
5. Impending/threatened change (important executive position)
6. Change in important executive position (cabinet, etc.)
7. Administrative structure change
8. Constitutional change
9. Legal change (election or appointment): legislature or supreme judicial body
10. Improper dismissal: legislature or supreme judicial body
11. Expulsion (refusal to seat member of legislature or supreme judicial body)
12. Improper interference or dismissal of regional/local political body or officials

E. Political Indicators

1. Nationalization of domestically owned firm(s)
2. Nationalization of foreign owned firm(s)
3. Arrests (political)
4. Exile or deportation
5. Execution (political)
6. Mass purge
7. Harassment of political organization (or individual)
8. Political organization banned or dissolved
9. Martial law or declaration of emergency
10. Charge of electoral irregularities
11. Restriction of press freedom
12. Assassination
13. Terrorism/sabotage (kidnapping, hijacking, etc.)
14. General strike (political)
15. Demonstrations, protests, and other organized civil disobedience (non-violent)
16. Sustained mass violence (insurrection, civil war, etc.)
17. Defection
18. Group demands: integration
19. Group demands: policy distribution
20. Party fractionalization
21. Political pact or treaty (e.g., prisoner exchange)
22. Political party (forms or ends)

Source: Facts on File.

F. Indices[5]

IV. Interstate Indicators

A. Political Interaction Variables (22 WEIS categories)[6]

Source: World Event Interaction Survey (WEIS) data base (see, e.g., Burgess and Lawton, 1972; McClelland, 1972).

B. Political Interaction Factors[7]

1. Diplomatic behavior received (19 categories)
2. Force acts received (3 categories)
3. Reward and yield acts received (2 categories)

C. Economic Interaction Variables

1. Imports
   a. food
   b. beverages, tobacco
   c. crude materials
   d. mineral fuels
   e. animal, vegetable oil, fat
   f. chemicals
   g. basic manufactures
   h. machines and transport equipment
   i. miscellaneous manufactured goods
   j. other

Source: UN Yearbook of International Trade.

2. Exports (see import list, a-j)

Source: UN Yearbook of International Trade.

3. Energy indicators
   a. total primary energy produced
   b. energy imports
   c. energy exports
   d. total energy consumed (aggregate)

Source: UN World Energy Supplies.

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[5]See Table 3-6, pp. 94-95.

[6]See Table 2-1, p. 22.

[7]See Table 3-9, p. 105.

D. Interstate Energy Relationships (Indices)

1. Energy Interdependency =

$$\frac{\text{energy imports + energy exports}}{\text{energy consumption}}$$

2. Energy Market Strength =

$$\frac{\text{energy exports}}{\text{energy production + imports}}$$

3. Energy Dependency =

$$\frac{\text{energy imports}}{\text{energy consumption + exports/production}}$$

E. General Trade Relationships (Indices)

4. Neo-Colonial Dependency =

$$\frac{\text{(industrial imports + unrefined exports)} - \text{(unrefined imports + industrial exports)}}{\text{total imports + total exports}}$$

5. Economic Involvement = total exports + total imports

F. Food Dependency and Advantage (Index)

6. Food Dependency =

$$\frac{\text{food imports - food exports}}{\text{food imports + food exports}}$$

G. General Interstate Economic Relations (Indices)

7. Import Concentration = $\sqrt{\frac{(Si)^2 - 1/10}{1 - 1/10}}$

8. Export Concentration = $\sqrt{\frac{(Ti)^2 - 1/10}{1 - 1/10}}$

V. Global Indicators

A. International Governmental Organization (IGO) Membership[8]
   1. Total IGO memberships per year
   2. Total new IGO memberships per year

Source: Yearbook of International Organizations (1973).

B. Conflict Within Bordering States[9]
   1. Total number of force events sent and received by nations land-bordering State X
   2. Total number of force events sent and received by nations sea-bordering State X
   3. Total number of force events sent and received by nations with colonies land-bordering State X
   4. Total number of force events sent and received by nations with colonies sea-bordering State X
   5. Total number of conflictual events (excluding force) sent and received by nations land-bordering State X
   6. Total number of conflictual events sent and received by nations sea-bordering State X
   7. Total number of conflictual events sent and received by nations with colonies land-bordering State X
   8. Total number of conflictual events sent and received by nations with colonies sea-bordering State X

Source: 1975 National Geographic Atlas of the World (borders); CBS News Almanac 1977 (data on year of statehood and mother country of colonies).

VI. State Classification Scheme Indicators

A. Economic Dimension
   1. GNP per capita

Source: U.S. Arms Control and Disarmament Agency, Worldwide Military Expenditures and Related Data (ACDA).

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[8]Data are available for all 77 countries, 1966-1973 time frame.

[9]This is based on the WEIS classification of conflictual and force events. The borders data consist of aggregated neighboring conflict scores for each state and total number of borders of each type (nation land, nation sea, colony land, colony sea).

2. Percent of Gross Domestic Product originating in agriculture

Source: UN Yearbook of National Accounts Statistics (UNAS).

3. Percent of Gross Domestic Product originating in industry

Source: UNAS.

4. Energy consumption per capita

Source: UN World Energy Supplies.

5. Percent of economically active male population engaged in agricultural occupations

Source: Food and Agriculture Organization, FAO Production Yearbook.

6. Percent of economically active male population engaged in professional and technical occupations

Source: International Labor Organization, Yearbook of Labor Statistics.

B. Capability Dimension

1. Size

a. total area

Source: UN Demographic Yearbook (UNDY).

b. total population

Source: UNDY.

c. GNP

Source: ACDA.

2. Military

a. total military manpower

Source: ACDA.

b. defense expenditures

Source: ACDA

c. defense expenditures per capita

Source: ACDA.

3. Resource base

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a. percent of energy consumed domestically produced

Source: UNSY.

C. Political Dimension
1. Development
a. number of political parties

Source: Political Handbook and Atlas of the World (PHAW) and Statesman's Yearbook (STYB).

b. horizontal power distribution

Source: Worldmark Encyclopedia of Nations (WEON), PHAW, and STYB.

c. local government autonomy

Source: WEON, PHAW, and STYB.

2. Structure
a. selection of effective executive
b. legislative effectiveness
c. legislative selection

Source: Banks.

3. Stability (1946-1965)[10]
a. average number of coups per year
b. average number of constitutional changes per year
c. average number of major cabinet changes per year
d. average number of changes in effective executive per year

Source: Banks: 1971.

D. State Classification Scheme Factors[11]
1. Economic (A-1, A-2, A-3, A-4, A-5, A-6, B-1-c, B-2-b, B-2-c)
2. Governmental (C-1-a, C-1-b, C-1-c, C-2-a, C-2-b, C-2-c)
3. Capability (B-1-a, B-1-b, B-1-c, B-2-a, B-2-b, B-3-a)
4. Political Instability (C-3-a, C-3-b, C-3-c, C-3-D)

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[10]These indicators provide contextual stability profiles for the pre-1966 period; 1966-1975 stability items appear above in the domestic conflict realm of the societal cluster.

[11]For details, see Wilkenfeld et al. (1978a, 1978b).

Appendix B

A TECHNICAL PRESENTATION OF DESIGN OPTIONS FOR A CROSS-NATIONAL CRISIS INDICATORS (CNCI) ANALYST PACKAGE

Although final decisions regarding the form and content of the CNCI application on DDF are yet to be made, we can specify a number of design characteristics which should be considered. In this section, a technical outline of a CNCI decision aid is offered. All major potential user options are included; some, of course, may be excluded in the final design. The following outline presents the possibilities as currently conceived and attempts to provide a "checklist" of options from which to choose.

I. Basic Prompts: The Initialization Phase

Four initial questions are posed to the user. These specify the data which will be accessed and utilized:

- What are the units of analysis?

  States or Aggregations of States (Regions) may be studied; thus Soviet GNP or Eastern European aggregate GNP may be the subject. Several units may be specified.

- Should data be percentagized?

  If data are to be output in percentage form, the user will be asked to define the super-set of countries (e.g., Soviet GNP as a percentage of World or Eastern European GNP).

- What year or years?

  Years 1966-1975 are generally available; some data are limited to fewer years.

- What variables should be accessed?

  All CNCI variables are available, including indices which are computed only when desired.

Answers to these four questions are followed by processing, i.e., data retrieval (and index computation when desired). A question mark (?) in response to any question results in instructional output; states, years, and variables will be listed.

II. Module Selection

Once initialization is completed, the user is given seven options corresponding to seven procedures of data usage. These options are offered after every procedure completion until STOP is demanded. The options are:

- **Change:** to alter one or more of the initialization parameters (units, years, variables, etc.) for another analysis;
- **Tables:** to access the table-generating module for data inspection;
- **Plots:** to access the plot-generating module to display data;
- **File:** to create a data-file on the PDP 11/70, which can be applied to other analytical uses, containing the requested information;
- **Compute:** to calculate user-defined indices from the CNCI data-base;
- **Analyze:** to access the Data Analysis Package for statistical operations on the selected data; and
- **Stop:** to end the program.

III. Tables Module

Selection of the Tables option results in output of data, on the terminal, in matrix fashion with accompanying labelling information. The module assumes the following output format:

- One table is generated for each state (or other unit of analysis);
- Variables define columns, years define rows;
- If only one year is specified, states/units define rows;
- If only one variable is specified, states/units define columns.

The user is given the option of changing this format by simply stating the desired table separator (one table per variable, or state, or year) and column definer (state, year, variable), the row defined by omission.

As with every module, output is followed by a return to Module Selection.

IV. Plots Module

Unlike the Tables Module, which simply outputs raw data, the Plots Module creates a more visual data display. It also requires more complexity in programming and demands more user-supplied information. Many kinds of plots are possible; here I will include most of these (although selectivity may be desired at a later time).

Two basic types of plots exist:

- Time-Series (assumed when two or more years are specified); and
- Cross-Sectional (assumed when only one year is specified).

A. Time-Series Plots

The default output characteristics are:

- Year defines the horizontal axis;
- Variable values define the vertical axis; and
- One state/unit per plot, one variable per plot.

The plotted values are, then, the variable values over time for the state. One plot exists for every state/unit. One plot is generated for each variable. The number of plots is (# of states) x (# of variables).

The user may change these output parameters if so desired. Possible changes are:

- Two or more states per plot;
- Two or more variables per plot (per vertical axis); or
- Cross-Sectional plots for each year or for selected years.

Adding states or variables to the plot, which increases output complexity and clarity, may be quite useful for comparison purposes. Cross-Sectional plots are quite different and are discussed below.

B. Cross-Sectional Plots

The default output characteristics are:

- States/units are along the horizontal axis;
- Variable values define the vertical axis; and
- One variable per plot, one year per plot.

Normally, only one year is originally requested; the exception occurs when the user wants Cross-Sectional analysis even though time-series is possible. The resultant plot depicts the locations of states on the selected variable for comparison.

Again, the user may choose to change the plot structure by specifying:

- Two or more variables per plot; or
- A situation in which a variable defines the horizontal axis.

Two or more variables may be placed along the vertical axis, as in Time-Series plotting. The option of defining the horizontal axis with a variable (instead of a state/unit) results in a plot of relationship between two variables on a cross-sectional basis; a time-series relationship is examined (in Time-Series plotting) by having two variables on an axis, generating two trend lines to compare.

V. File Module

It is quite possible that some decision analysts may wish to employ CNCI data in contexts which are not permitted by this software package. For example, many statistical routines are not available in this product; additionally, the user may want to merge CNCI data with other data-sets (like WEIS) for further analysis. In any case such as this, the File Module allows the user to output CNCI data onto a file which will be stored in the DDF PDP 11/70; the file may then be used in any desired manner.

File creation begins by simply specifying, in the initialization phase, the desired units/years/variables. This defines the relevant data which enter the file. The user supplies a file name; the default format is as follows:

- Each Card: 2F4.0 (2 identifiers)
  6Fx,y (6 variable values)
  col. 72-80 sequence number
- Identifiers: State, Year (default)
  Option: Change either or both identifier(s); variable number may be an identifier.
- File Structure: Sorted by Identifier #1; within that sorted by Identifier #2.
- Output: Variable column locations, # of records.

When a file is saved, future runs of the program will ask the user if they should be retrieved with or instead of the CNCI data-base.

VI. Compute Module

Available to the user are numerous CNCI variables and indices. Nevertheless, the intensive researcher often devises new and innovative indicators which are especially suited to idiosyncratic or current problems. This need can be partially met by allowing the user to perform standard arithmetic operations (addition, subtraction, etc.) on any variable or combination of variables in the CNCI data-set.

The programming aspect of this module is more complex than the simple user instructions:

- Name the new index; and
- Enter the formula.

The formula must be in FORTRAN mode; instructions can be provided. Only variables requested in initialization may be used.

The indices computed by the user are new variables which are simply added to the list of variables specified in the initialization phase. All tables, plots, and file creations would include these new indices, for example. They would not be saved, however, unless the File Module is used.

VII. Analyze Module

The previously discussed modules are designed to provide raw information to the user. The Analyze Module is designed to supplement the data-display modules with an ability to provide statistical descriptions of CNCI data. Researchers interested in more analytical uses of the available data and indices will wish to utilize various statistical operations which might enter the CNCI program menu of modules.

Because of the variety of statistical procedures which might apply to CNCI data analysis, the comprehensiveness and complexity of this module must be considered. First, the inclusion of numerous analytical techniques is expensive, duplicates programming contained in other software systems, confuses the untrained user, and fails to satisfy the sophisticated analyst, whose needs can never be completely satisfied within a single decision-aid. Secondly, the File Module is designed to permit the use of CNCI data when accessing other software -- including statistical routines -- and therefore reduces the need for total internal comprehensiveness. Thirdly, the decision-aid should provide the most common statistical procedures to avoid the need to utilize the File Module for relatively simple operations.

The more sophisticated user is capable of transferring CNCI data (through the File Module) to other statistical software. The naive user, however, should not be required to use the File Module and other software for his or her relatively straightforward statistical needs. Therefore, the CNCI decision-aid should focus upon the needs of naive users while encouraging others to use the File Module as well as other DDF-supported programs.

The Analyze Module will have, as a minimum, the following options:

- **Describe:** the means, maximums, minimums, variances, etc. of requested variables will be output. Statistics refer to the states/units and years included only; and;

- **Correlate:** Pearson's r (and other measures of association) will be output; intercorrelations of all included variables.

Several other statistical routines may be considered, although it may be advisable to relegate these to autonomous software developments:

- **Regression:** simple and multiple regression of selected variables;

- **Model:** multiple equation estimation routine, user-supplied equations;

- **NIPALS:** latent variable and regression routine, user-specified relationships; and

- **Projections:** forecasts using ARMA processes.

These six options, which hardly exhaust the possibilities, are fairly representative of conceivable analyses of CNCI data. The four which are not recommended are presumably valuable only to sophisticated users (who are capable of employing other software systems).

VIII. Effort

This outline of a prototypical CNCI decision-aid is merely suggestive. Although some technical details have been presented, actual design awaits final decisions regarding features which may or may not actually benefit the analyst. Certain opinions have been covertly and overtly brought into the foregoing discussion in order to provide the foundation for these necessary decisions.

Cost estimates depend upon the final approved design. Some consideration of cost, however, may affect the latter. The Plots Module, which will require the greatest effort, may be construed to be invaluable. The Analyze Module is also a difficult project, although a reduction in thoroughness can sharply reduce the projected cost/time for software development. The File Module, Tables Module, and Change Module are all essential and are the least complicated options. The Compute Module, while not extremely complex in programming effort, demands considerable instructional material for the benefit of the naive user.

At a basic level, this CNCI decision-aid could dispense with the Plots, Compute, and Analyze Modules; these could be added at a later date. This plan would greatly reduce the initial set-up time and would also provide a basis for those enhancements deemed necessary or desirable by the user com-

munity. Because the decision-aid has been presented in modular fashion, and because it will so operate, continual enhancements are possible. This is a major feature of our design and recommends a low-cost initialization period, followed by those increases in flexibility which are warranted.

Appendix C
HISTORICAL CRISIS DATA SETS: DOCUMENTATION AND PROCEDURES*

Overview

The WEIS (World Event Interaction Survey) Historical Crisis Data Sets include data for four specific international crises:

1. The Japanese attack on Pearl Harbor (December, 1941);
2. The German invasion of the Soviet Union (June, 1941);
3. The outbreak of the Korean War (June, 1950);
4. The Cuban missile crisis (October, 1962).

Data on these crises were coded according to the standard WEIS categories, relying on the New York Times Index and, in some cases, the Times itself. These data, which were collected for the principal actors in each crisis, spanned a period from 18 months prior to the crisis and to one month subsequent to the actual crisis. The final product was a set of cards, with one card per event.

Specific Procedures

Eight research assistants were employed to code and keypunch the data. Prior to the actual coding, coders were carefully

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*The author and Jonathan Wilkenfeld rendered professional consulting services to the Defense Advanced Research Projects Agency (DARPA) under Contract No. MDA-903-75-C-0227 (Task #68). Expenses were paid by the Essex Corporation (Alexandria, Virginia). We would like to express our appreciation to Dr. Stephen J. Andriole and Terri Coleman of DARPA and to Judith Paris. We also wish to thank the research assistants who worked so professionally and diligently on this project: Merle Feldbaum; Lily Fountain; William Goodwin; May Ellen Hale; Minette Perler; Stuart Perry; Helene F. Rubinstein; and Lee Ann Taylor.

trained in the WEIS coding procedure. All of the coders read the WEIS Events Data and Coding manual. Part of this task involved the generation of intercoder reliability data (discussed below).

Pearl Harbor was used as a test case. The Pearl Harbor coding operation revealed the scope and nature of the problems or "bugs" which existed. The other crises were coded sequentially.

The research assistants and project directors met on a weekly basis. During these meetings, various issues were resolved. As a basis for the sessions, the directors provided "fact sheets," basic chronologies, and lists of key decision-makers for the principal actors. The weekly meeting provided an excellent forum for discussing the WEIS coding scheme, answering questions about specific aspects of the various crises, and resolving coding ambiguities.

Coder Reliability Check (May 1977)

The intercoder reliability check involved the four coders who were working on the Pearl Harbor case. Each individual coded data for the 15-day period from August 1 to August 15 (1941) for all states in the crisis and for all 22 of the WEIS categories.

Coder reliability scores were calculated with a standard formula:

$$\frac{2\,M}{N\,1 + N\,2},$$

where M is the number of agreements between two coders, N 1 is the total number of a certain category of events found by Octo-1, and N 2 is the total for coder 2. Coder reliability (CR) coefficients for the four coders were:

CR(1,2) = .65	CR(1,4) = .79	CR(2,4) = .77
CR(1,3) = .74	CR(2,3) = .69	CR(3,4) = .80
CR(All) = .74		

The last figure is the average coder reliability score for the group of four coders.

We conducted a series of lengthy discussions in an attempt to pinpoint the areas and categories which posed the most serious problems. Four categories emerged as the most problematic: comment; consult; accuse; and reduce relations. Collapsing the 22 categories into a smaller subset or dichotomizing the data into cooperation and conflict domains would reduce to obviate the reliability problems alluded to above.

In addition to certain "group" reliability problems, individual coder category problems also became apparent. The extensive discussions clarified and resolved the coder-specific problems.

The coder reliability check highlighted the difficulties which were attributable to the specific period which was coded. These can be summarized as follows:

1. The task of coding events in the midst of a systemic or world was is extraordinarily problematic, given the complexity and scope of the coding operation. Such thorny issues as occupation or "puppet" regimes and governments-in-exile complicate the task considerably.

2. Only the key states in the crisis were coded (the United States, Japan, Germany, Italy, the United Kingdom, and the Soviet Union). Actions which were generated by other states but were directed toward one of the six were also coded.

3. The Times Index was both sketchy and occasionally inaccurate for the 1940-1941 period. (This situation changed for the later crises; the indexing procedure became more comprehensive and more accurate.)

We concluded that intercoder reliability was sufficient, given the ambiguities inherent in the coding operation. This assessment of the overall CR score of .74 is based on the following criteria:

- The Pearl Harbor case was unusually complex; the latter crises were less complicated. (The training aspects of the reliability check and the actual experience which accrued from the Pearl Harbor case coding should also be noted.)
- The directors and coders all concluded that the inclusion of other members of the international system complicated the basic task and reduced the reliability scores. Since the primary focus was interactions between and among major actors in a crisis, we decided to limit coding to major state interactions in the subsequent case study coding operations.
- No minimum level of reliability can be imposed by fiat. The overall coefficient (.74) is at least adequate and provides evidence that there is intercoder agreement, given the inherent complexities and ambiguities of the specific case (Pearl Harbor) and the general coding task.

Additional Codes

We employed the standard WEIS list of states and country codes. Historical idiosyncracies dictated the addition of four new codes:

1. 711 - Nationalist China (for crisis #3, Korean War);
2. 030 - Latin America (for crisis #1, Pearl Harbor);
3. 219 - Vichy France (for crisis #1, Pearl Harbor);
4. 851 - Netherlands East India (for crisis #1, Pearl Harbor).

It should be noted that only one Germany existed prior to 1945. For crises 1 and 2 (Pearl Harnor and the German invasion of the USSR), the WEIS codes 255 (Federal Republic of Germany) and 265 (Democratic Republic of Germany) were used interchangably.

Salient Coding Decisions

As noted above, the Pearl Harbor test case was very complex. The major coding decisions are listed below.

1. The situation in which state X urges its nationals in Y to return to X was not coded as an event.
2. "Official" press comments (e.g., the British Broadcasting Corporation or Tass) posed problems. The basic issue concerned the situation in which actor A (e.g., the BBC in the U.K.) accused actor B (e.g., Germany) of an action directed toward a third state. We decided to code these only as "comments" from A to B.
3. Specific dates were provided for the fall of governments and colonies and the creation of governments-in-exile. This resolved such questions as the treatment of "Yugoslavia" after it was seized or absorbed by Germany.
4. Both Vichy France and French Indochina were coded as France.
5. Manchuko was coded as Japan.

The key dates for the Pearl Harbor/German invasion of the USSR period are provided below for users who may find the information helpful.

1939

SEP 1 Poland was invaded by Germany.

SEP 3 Britain and France declared war on Germany.

NOV 3 U.S. Neutrality Act of 1939 was amended (this action repealed embargo on arms and placed exports to belligerents on a cash and carry basis).

1940

MAR 30 A puppet Chinese government under Wang Ching-wei was set up at Nanking with Japanese support.

APR 9 Germany occupied Denmark and invaded Norway.

1940 (Cont'd.)

MAY 10	Germany invaded Belgium, the Netherlands, and Luxemburg.
JUN 10	Italy declared war on France and Britain.
JUN 22	French-German armistice was signed.
JUL 1	Rumania turned to Germany for support and renounced Anglo-French guarantee.
JUL 16	In Japan a new prime minster (Prince Fumumaro Konoye) came into power to carry out a program of national consolidation and defense.
JUL 21	Lithuania, Latvia, and Estonia asked to be admitted to USSR.
SEP 22	Japanese forces begin occupation of French Indochina.
SEP 27	Three-Power Pact (Germany, Italy, Japan) was signed.
OCT 11	Rumania passed under German control.
OCT 28	Italy attacked Greece.
NOV 20	Hungary endorsed fascist pact.

1941

MAR 11	Congress passed Lend-Lease Act.
JUN 22	German invasion of Russia.
JUN 23	Vichy France announced that it had granted Japan's demand for military control of Indochina.
OCT 17	General Tojo became Premier and Minister of War of Japan.
DEC 7	Pearl Harbor.
DEC 8	U.S. declared war on Japan.
DEC 11	Germany and Italy declared war on U.S.
DEC 25	Japan captured Hong Kong.

1942

FEB 1	Quisling became puppet leader of Norway.
AUG 30	Annexation of Luxemburg by Germany.
OCT 1	Germany formally annexed northern Slovenia.
DEC 1	Darlan (approved by Allies) assume authority as Chief of State in French North Africa.

Poland

SEP 29, 1939	Germany and Russia divided Poland.

Norway

APR 30, 1940	The King and cabinet escaped to London to continue resistance.

Netherlands

MAY 13, 1940	The Government escaped to London.

France

JUN 23, 1940	de Gaulle pledged continued French opposition to Germany; French National Committee in London.
NOV 11, 1942	German forces entered unoccupied France.

Balkans

APR 6, 1941	Germans poured into Yugoslavia and Greece.
APR 17, 1941	Yugoslavia capitulated; resistance began.
APR 23, 1941	Greece signed an armistice; King fled to Crete.

Western Hemisphere

APR 9, 1941	U.S. agreed with Denmark to defend Greenland.
JUL 7, 1941	U.S. forces entered Dutch Guiana.

Africa

AUG 6, 1940	Italy invaded British Somaliland; completed conquest by August 19 (by the end of 1941, all Italian East Africa was under British control).
NOV 8, 1942	Invasion of French North Africa.
NOV 11, 1942	Armistice.

China and Asia

MAR 30, 1940	Puppet government at Nanking, China.
DEC 21, 1941	Thailand-Japan treaty.
JAN 11, 1942	Japan began occupying Netherlands East Indies (occupation period continued until January 31).
FEB 15, 1942	Japan captured Singapore.
MAR 1, 1942	Japan occupied Burma.

WEIS CODING SHEET

Year [ ][ ]

Month [ ][ ]

Day [ ][ ]

Initiator [ ][ ][ ]

Event Type [ ][ ][ ]

Target [ ][ ][ ]

Source [ ][ ]

Coder ID [ ][ ]

Arena [ ][ ][ ]

Data Collection ID [ ][ ][ ][ ]

Serial Number of Item [ ][ ][ ][ ]

Analytic Deck [ ]

Comment:

Source:

01 New York Times
02 Times of London

Arena

091 Pearl Harbor
092 German Invasion of USSR
093 Chinese Invasion of S.K.
094 China - India
095 Cuban Missile Crisis

ID of Coded Data Collection

91 Pearl Harbor
92 Germany - USSR
93 - China - S. Korea
94 - China - India
95 - Cuba

Appendix D

MONTHLY FREQUENCY AND NET POSITIVITY SCORES: OTHER DYADS

A. Pearl Harbor

MONTH	U.S.-U.K.	#	U.S.-Italy	#	U.S.-USSR	#	U.K.-U.S.	#	U.K.-Ger.	#	U.K.-Italy	#	U.K.-USSR	#
JAN 40	-2.02	10	2.51	1	2.57	1	12.02	12	-20.81	10	0	0	-1.21	4
FEB 40	12.79	5	2.94	1	-2.65	1	12.51	7	-19.54	9	1.87	2	-2.65	1
MAR 40	10.98	7	2.94	1	0	0	17.65	6	-5.84	5	4.28	9	-1.27	4
APR 40	9.78	5	2.94	1	3.05	2	15.53	6	-19.65	11	-4.88	4	-3.18	1
MAY 40	5.88	2	5.49	6	2.57	1	10.92	4	-26.13	12	-7.66	7	2.94	1
JUN 40	4.40	2	-4.62	5	2.94	1	6.40	7	-4.18	6	-14.68	7	0	0
JUL 40	3.05	2	.11	1	-3.72	2	5.51	2	0	0	-2.65	1	0	0
AUG 40	0	0	0	0	2.94	1	.11	1	0	0	-1.70	2	0	0
SEP 40	0	0	0	0	0	0	1.27	2	0	0	0	0	0	0
OCT 40	21.82	10	1.23	3	0	0	19.78	9	-17.02	9	-22.03	6	8.58	8
NOV 40	20.50	9	2.89	2	0	0	19.22	9	1.08	2	-1.66	6	6.86	4
DEC 40	24.46	10	0	0	0	0	32.86	16	-3.56	3	-.80	4	0	0
JAN 41	20.74	19	4.54	6	5.57	3	30.09	21	-9.32	16	2.78	3	-6.40	5
FEB 41	33.30	14	8.83	3	0	0	15.62	13	-26.13	16	-5.31	2	0	0
MAR 41	25.71	10	-7.66	8	11.13	6	42.38	19	-29.92	13	.22	2	0	0
APR 41	47.02	17	-20.19	10	.11	1	56.33	28	-1.33	6	-4.97	5	11.56	6
MAY 41	37.76	19	-13.03	7	-1.63	3	29.36	20	0	0	.85	2	0	0
JUN 41	57.99	26	-24.92	13	10.19	7	51.95	26	0	0	0	0	9.73	7
JUL 41	44.88	21	-11.99	9	22.68	14	46.36	28	0	0	-6.16	2	34.01	14
AUG 41	40.59	17	-10.40	4	38.30	25	36.29	22	0	0	0	0	24.58	12
SEP 41	109.06	52	-11.36	4	62.84	31	84.61	37	0	0	-3.23	2	63.30	27
OCT 41	65.99	26	-9.55	4	47.81	34	58.97	31	0	0	-1.81	1	42.22	27
NOV 41	35.24	21	-7.34	5	20.72	14	70.14	33	0	0	-.82	3	21.99	9
DEC 41	109.74	45	-22.07	16	31.52	16	105.89	43	0	0	.02	3	22.74	13
JAN 42	24.48	10	3.38	1	8.68	3	20.98	8	0	0	0	0	8.34	4
Sum	764.13	359	-114.67	111	274.43	166	808.77	410	-182.36	118	-68.34	73	242.43	147
Mean	30.57		-4.57		10.98		32.35		-7.29		-2.73		9.70	
S.D.	29.99		8.84		17.20		26.98		-10.36		5.57		16.74	

Appendix (Cont'd.)

Month	U.K.-Japan	#	Ger.-U.K.	#	Ger.-Italy	#	Ger.-USSR	#	Ger.-Japan	#	Italy-U.S.	#	Italy-U.K.	#
JAN 40	2.38	3	-29.45	14	.42	5	13.96	5	0	0	.11	1	-2.55	2
FEB 40	0	0	-30.26	13	0	0	7.87	4	1.24	1	3.05	2	-.78	3
MAR 40	7.25	5	-10.67	8	14.55	5	2.51	1	0	0	2.94	1	-.88	9
APR 40	-2.74	2	-48.70	18	0	0	0	0	0	0	2.94	1	-6.82	5
MAY 40	0	0	-35.03	15	4.63	2	2.78	1	0	0	4.02	3	-12.17	9
JUN 40	-1.87	1	-21.15	8	14.28	5	2.78	1	0	0	-3.65	2	-6.70	2
JUL 40	2.57	1	-4.21	3	8.40	3	5.29	2	1.27	2	-2.65	1	-4.87	6
AUG 40	.11	1	-6.24	5	0	0	-2.84	3	0	0	0	0	.11	1
SEP 40	0	0	-2.55	2	2.78	1	0	0	0	0	0	0	0	0
OCT 40	1.93	4	-7.75	4	24.23	9	3.98	5	3.43	3	-6.29	4	-20.09	6
NOV 40	0	0	-14.48	9	6.90	3	11.50	5	5.03	2	4.02	2	-10.11	8
DEC 40	0	0	-18.48	9	8.25	4	0	0	8.66	3	0	0	-1.04	3
JAN 41	-18.10	8	-22.00	10	17.33	7	2.27	7	6.92	3	1.24	3	-8.25	4
FEB 41	-7.45	4	-16.87	13	14.06	5	2.94	1	8.79	6	-.99	9	.11	1
MAR 41	-1.04	7	-12.03	12	7.79	3	-1.70	2	11.34	4	-2.74	2	-10.90	5
APR 41	-3.05	2	-26.03	14	5.56	3	2.78	1	8.77	4	-16.55	20	-3.38	3
MAY 41	-5.12	5	-9.04	4	5.88	2	5.72	2	5.88	2	-.12	2	-2.53	3
JUN 41	0	0	-1.46	5	5.72	2	-11.57	12	2.51	1	-22.06	10	0	0
JUL 41	-9.27	4	-10.23	4	2.94	1	-13.95	8	3.86	3	-4.06	7	0	0
AUG 41	-3.23	3	-7.93	8	6.47	3	-2.33	4	0	0	.95	4	.11	1
SEP 41	-5.77	5	-8.64	4	4.18	2	-10.21	5	6.58	5	-11.19	5	-2.84	1
OCT 41	-2.12	7	-24.47	18	27.20	14	-21.59	12	.61	6	-15.13	11	-4.46	2
NOV 41	-20.42	12	-9.17	4	10.70	5	-20.51	12	11.17	6	-22.66	13	-2.06	3
DEC 41	-33.38	22	-15.81	7	17.28	7	-4.91	6	31.56	12	-11.99	9	0	0
JAN 42	.22	2	-7.96	3	11.02	4	-1.81	1	8.29	5	0	0	0	0
Sum	-107.11	98	-400.61	214	217.76	95	-24.24	100	125.92	68	-100.81	112	-100.10	77
Mean	-4.28		-16.02		8.83		-0.97		5.04		-4.03		-4.00	
S. D.	8.63		11.39		7.27		8.79		6.77		7.94		5.06	

Appendix (Cont'd.)

Month	Italy-Germany	#	Italy-USSR	#	Italy-Japan	#	USSR-U.S.	#	USSR-U.K.	#	USSR-Germany	#	USSR-Italy	#
JAN 40	2.94	1	.11	1	0	0	-7.74	5	-22.87	15	11.82	7	-3.34	2
FEB 40	0	0	.11	1	0	0	-4.53	3	-5.20	3	4.49	3	-1.88	1
MAR 40	14.55	5	2.94	1	0	0	-2.65	1	-3.67	6	0	0	0	0
APR 40	5.03	2	0	0	0	0	2.94	1	-3.73	2	2.51	1	0	0
MAY 40	7.54	3	0	0	0	0	0	0	-2.36	3	2.78	1	0	0
JUN 40	14.55	5	.11	1	0	0	2.94	1	2.73	3	-.72	2	0	0
JUL 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AUG 40	0	0	0	0	.11	1	-2.89	3	-1.88	2	0	0	0	0
SEP 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OCT 40	24.45	9	0	0	.65	2	0	0	16.37	6	1.92	4	-1.67	1
NOV 40	5.88	2	2.89	2	2.51	1	0	0	.10	2	9.69	7	2.89	2
DEC 40	0	0	0	0	2.78	1	0	0	-1.98	1	0	0	0	0
JAN 41	7.34	3	0	0	0	0	.29	2	-6.38	3	-.46	7	0	0
FEB 41	15.19	7	0	0	0	0	1.46	6	-4.42	4	.11	1	0	0
MAR 41	0	0	0	0	2.51	1	6.90	3	0	0	3.05	2	0	0
APR 41	3.05	2	0	0	8.83	3	.94	3	6.39	5	2.89	2	0	0
MAY 41	0	0	2.94	1	5.88	2	1.07	3	-2.84	1	0	0	2.94	1
JUN 41	0	0	-4.04	1	1.24	1	13.41	8	13.96	5	0	0	0	0
JUL 41	0	0	0	0	.11	1	22.59	11	20.64	9	0	0	0	0
AUG 41	0	0	.11	1	.11	1	32.50	16	13.48	8	0	0	-1.81	1
SEP 41	0	0	.11	1	0	0	50.68	24	36.51	17	0	0	0	0
OCT 41	0	0	-4.32	2	2.62	2	17.33	8	18.43	9	0	0	0	0
NOV 41	0	0	.08	4	8.18	4	20.45	11	5.64	5	0	0	-1.87	1
DEC 41	0	0	0	0	13.64	6	31.58	13	13.83	6	0	0	0	0
JAN 42	0	0	0	0	6.58	3	5.30	2	8.79	4	0	0	0	0
Sum	100.53	41	1.02	16	55.75	29	195.22	122	101.57	119	38.07	37	-4.71	9
Mean	4.02		.04		2.23		7.70		4.06		1.52		.03	
S. D.	6.57		1.59		3.62		14.05		11.79		3.11		1.73	

Appendix (Cont'd.)

Month	USSR-Japan	#	Japan-U.K.	#	Japan-Germany	#	Japan-Italy	#	Japan-USSR	#
JAN 40	5.67	3	-5.73	4	0	0	0	0	8.34	3
FEB 40	0	0	0	0	0	0	0	0	0	0
MAR 40	-3.34	1	5.72	2	0	0	0	0	-6.34	4
APR 40	-3.40	2	2.23	5	0	0	0	0	0	0
MAY 40	-3.50	1	-2.65	1	0	0	6.10	3	0	0
JUN 40	0	0	0	0	0	0	2.94	1	0	0
JUL 40	0	0	0	0	0	0	0	0	0	0
AUG 40	0	0	0	0	0	0	0	0	0	0
SEP 40	0	0	-3.40	2	0	0	.11	1	.11	1
OCT 40	4.02	3	.86	5	2.78	1	2.51	1	8.56	4
NOV 40	2.94	1	0	0	2.94	1	0	0	0	0
DEC 40	2.94	1	11.18	4	0	0	2.78	1	2.94	1
JAN 41	8.50	3	-3.09	8	11.51	5	0	0	7.48	6
FEB 41	5.57	3	-25.42	17	2.94	1	0	0	11.56	6
MAR 41	3.05	2	-.44	6	14.28	5	2.94	1	.10	2
APR 41	11.52	9	8.61	5	0	0	14.50	7	15.14	6
MAY 41	5.88	2	.29	2	0	0	5.88	2	5.88	2
JUN 41	8.34	3	-11.55	6	0	0	2.51	1	9.38	7
JUL 41	-1.76	2	-12.89	5	0	0	0	0	-13.04	6
AUG 41	-1.67	1	-17.87	12	0	0	0	0	-5.30	5
SEP 41	-5.11	2	-20.01	15	0	0	10.06	4	-19.83	11
OCT 41	-4.46	2	-11.84	10	0	0	2.57	1	-3.58	8
NOV 41	-3.78	6	-23.89	12	0	0	8.07	3	-13.09	13
DEC 41	-2.62	5	-70.44	27	0	0	9.31	4	1.19	9
JAN 42	3.25	5	-6.97	3	0	0	5.56	2	4.92	4
Sum	32.04	57	-207.10	151	51.30	13	75.85	32	17.37	98
Mean	1.28		-7.94		1.83		3.38		.69	
S. D.	4.53		15.79		4.10		4.08		7.99	

Appendix (Cont'd.)

B. Korean War

Month	U.S.-N KOR	#	U.S.-S KOR	#	USSR-China	#	USSR-N KOR	#	USSR-S KOR	#	China-USSR	#
JAN 49	-2.65	1	8.40	3	0	0	5.46	2	0	0	0	0
FEB 49	0	0	2.94	1	0	0	2.51	1	.11	1	0	0
MAR 49	0	0	2.51	1	0	0	8.66	3	0	0	1.02	1
APR 49	0	0	1.34	4	5.56	3	0	0	0	0	7.97	3
MAY 49	0	0	3.96	2	0	0	0	0	0	0	0	0
JUN 49	0	0	3.38	1	2.51	1	0	0	0	0	0	0
JUL 49	0	0	-1.98	1	.11	1	0	0	0	0	2.51	1
AUG 49	0	0	5.90	2	2.78	1	0	0	.11	1	2.78	1
SEP 49	0	0	2.94	1	0	0	0	0	0	0	0	0
OCT 49	0	0	1.02	1	8.08	4	0	0	0	0	5.68	4
NOV 49	0	0	0	0	0	0	0	0	0	0	0	0
DEC 49	0	0	6.77	2	2.94	1	0	0	0	0	6.58	4
JAN 50	0	0	6.16	2	3.72	4	0	0	0	0	7.23	4
FEB 50	0	0	0	0	19.76	8	0	0	0	0	6.31	3
MAR 50	2.57	1	0	0	2.78	1	0	0	0	0	5.29	2
APR 50	0	0	-3.34	1	2.94	1	0	0	0	0	2.94	1
MAY 50	0	0	0	0	0	0	0	0	0	0	0	0
JUN 50	-4.30	4	27.67	13	0	0	0	0	-10.61	4	0	0
JUL 50	-11.28	11	20.58	8	0	0	0	0	-2.65	1	.11	1
Sum	-15.63	17	88.27	43	51.19	25	16.64	6	-13.05	7	48.43	25
Mean	.82		4.64		2.69		.88		.69		2.55	
S.D.	2.85		7.59		4.72		2.32		2.48		2.98	

Month	China-N KOR	#	China-S KOR	#	N KOR-U.S.	#	N KOR-USSR	#	N KOR-China	#	N KOR-S KOR	#
JAN 49	0	0	0	0	0	0	2.94	1	0	0	-4.04	1
FEB 49	0	0	0	0	-4.04	1	0	0	0	0	0	0
MAR 49	0	0	0	0	0	0	8.66	3	0	0	0	0
APR 49	0	0	0	0	0	0	0	0	0	0	0	0
MAY 49	2.78	1	0	0	0	0	0	0	2.78	1	0	0
JUN 49	0	0	0	0	0	0	0	0	0	0	0	0
JUL 49	0	0	0	0	.11	1	0	0	0	0	-4.23	3
AUG 49	0	0	0	0	0	0	0	0	0	0	0	0
SEP 49	0	0	0	0	0	0	0	0	0	0	-1.07	1
OCT 49	0	0	0	0	0	0	0	0	0	0	-1.67	1
NOV 49	0	0	0	0	0	0	0	0	0	0	0	0
DEC 49	0	0	0	0	0	0	0	0	0	0	0	0
JAN 50	0	0	0	0	0	0	0	0	0	0	0	0
FEB 50	0	0	0	0	0	0	0	0	0	0	-4.04	1
MAR 50	0	0	-2.65	1	0	0	0	0	0	0	0	0
APR 50	0	0	0	0	0	0	0	0	0	0	0	0
MAY 50	0	0	0	0	0	0	0	0	0	0	-7.39	2
JUN 50	0	0	0	0	-2.65	1	0	0	0	0	-9.41	10
JUL 50	0	0	0	0	-10.96	5	0	0	0	0	-7.93	4
Sum	2.78	1	-2.65	1	-17.55	8	11.61	4	2.78	1	-39.87	23
Mean	.15		-1.40		-9.20		.61		.15		-2.10	
S. D.	.64		.61		2.66		2.06		.64		3.14	

Appendix (Cont'd.)

Month	S KOR-U.S.	#	S KOR-USSR	#	S KOR-China	#	S KOR-N KOR	#
JAN 49	10.92	4	.22	2	0	0	.22	2
FEB 49	0	0	0	0	0	0	.11	1
MAR 49	0	0	-2.65	1	0	0	-4.04	1
APR 49	1.35	2	0	0	0	0	-2.65	1
MAY 49	6.53	6	.22	2	0	0	.11	1
JUN 49	0	0	0	0	0	0	.11	1
JUL 49	8.21	6	0	0	0	0	-6.70	2
AUG 49	-1.88	2	-1.98	1	0	0	-2.65	1
SEP 49	4.18	2	-2.65	1	0	0	0	0
OCT 49	0	0	0	0	.11	1	-2.74	2
NOV 49	0	0	0	0	0	0	0	0
DEC 49	0	0	0	0	0	0	0	0
JAN 50	9.23	7	0	0	0	0	0	0
FEB 50	6.56	5	0	0	0	0	0	0
MAR 50	2.94	1	0	0	0	0	-3.34	1
APR 50	-1.41	2	0	0	0	0	.11	1
MAY 50	0	0	0	0	0	0	.11	1
JUN 50	21.05	10	-4.04	1	0	0	.15	4
JUL 50	13.48	7	0	0	0	0	.22	2
Sum	81.17	54	-10.90	8	.11	1	-21.00	21
Mean	4.27		-.57		.01		-1.10	
S. D.	6.10		1.25		.03		1.99	

C. Cuban Missile Crisis

Month	Cuba-USSR	#	USSR-Cuba	#
APR 61	8.78	4	4.55	3
MAY 61	5.03	2	5.90	2
JUN 61	0	0	2.89	2
JUL 61	0	0	2.51	1
AUG 61	2.51	1	0	0
SEP 61	5.88	2	14.40	6
OCT 61	2.94	1	6.58	4
NOV 61	5.88	2	5.88	2
DEC 61	0	0	0	0
JAN 62	0	0	.22	2
FEB 62	0	0	5.03	2
MAR 62	0	0	0	0
APR 62	0	0	2.51	1
MAY 62	0	0	0	0
JUN 62	2.51	1	0	0
JUL 62	5.88	2	9.27	3
AUG 62	2.94	1	3.96	4
SEP 62	7.81	3	6.38	4
OCT 62	2.37	3	2.51	1
NOV 62	31.83	17	26.50	13
Sum	84.39	39	99.10	50
Mean	4.22		4.95	
S. D.	7.11		6.27	

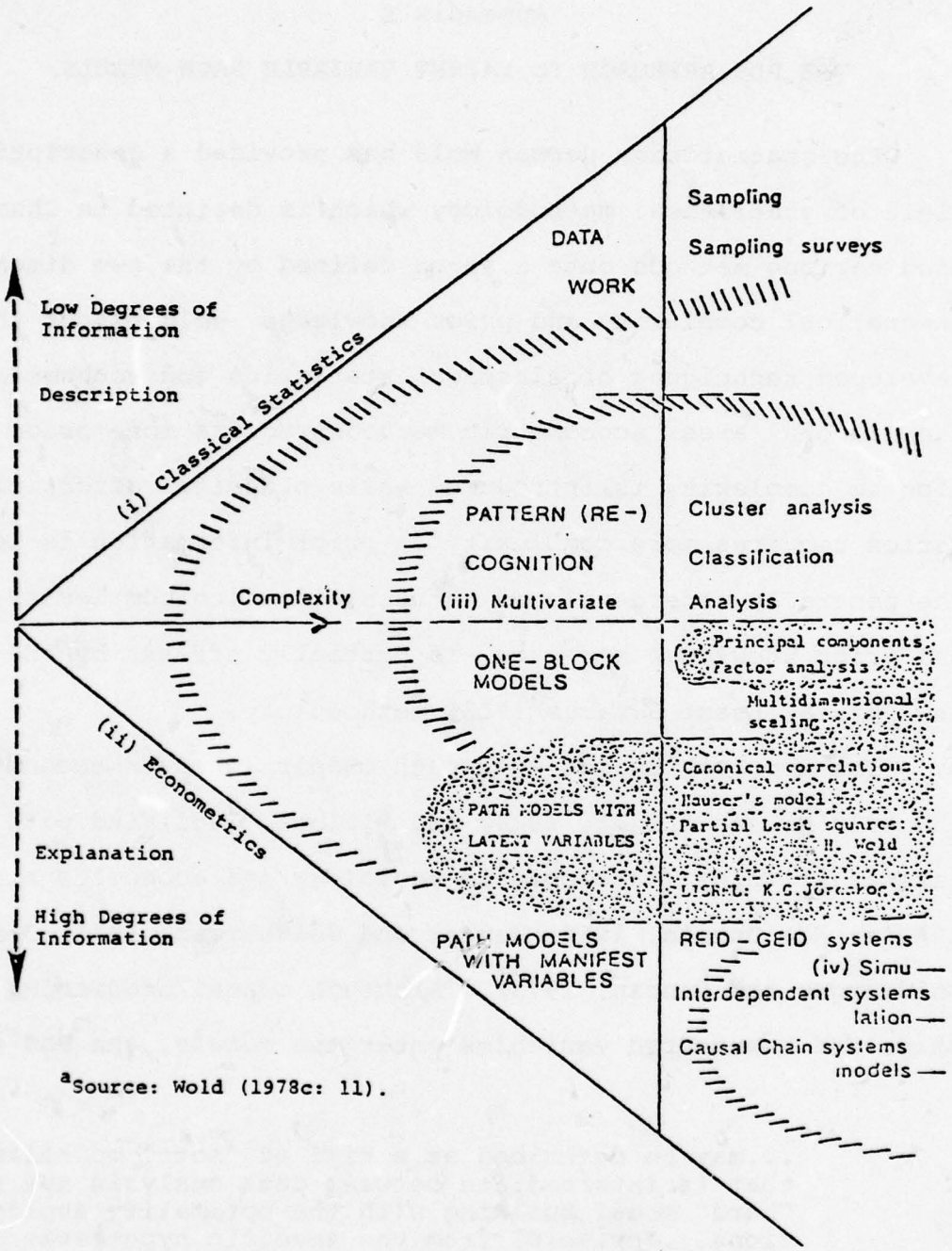
Appendix E

THE PLS APPROACH TO LATENT VARIABLE PATH MODELS

The statistician Herman Wold has provided a description of the field of statistical methodology which is depicted in Chart 1. Mapping various methods onto a space defined by the two dimensions of theoretical complexity and prior knowledge, Wold places the well-developed techniques of classical statistics and econometrics along the diagonal axes; econometric methods require more prior information as complexity is introduced while classical descriptive statistics requires more complexity as prior information is lessened. The generally underdeveloped terrain, in which complexity is high and prior knowledge moderate, is partially off-set by the relatively new Partial Least Squares (PLS) methodology.

The approach builds upon path models (used in econometrics since the 1930's; see Wright, 1934, and Blalock, 1961) and path models with latent variables (developed in sociology and economics since the 1960's; see Duncan, 1966; Hauser and Goldberger, 1971; Joreskog, 1970; Goldberger and Duncan, 1973). Although causal/predictive relationships and unmeasured variables enter the models, the PLS approach:

> ...may be described as a kind of "soft" modelling that is intermediate between data analysis and the "hard" model building with the optimality aspirations...derive[d] from the specific hypotheses on distributional properties of variables and residuals...[PLS] models are less specific, involving only the minimum of hypotheses that are needed to support the operative use of the model [Wold, 1976: 7].



[a]Source: Wold (1978c: 11).

Chart 1

MAPPING STATISTICAL METHODS WITH REGARD TO THE COMPLEXITY OF THE PROBLEM AND THEIR DEGREE OF PRIOR INFORMATION[a]

The PLS modeling strategy aims at statistical consistency rather than optimal efficiency (Wold, 1978a: 4), which distinguishes the approach from contemporary statistics, including Maximum Likelihood (ML). Whereas the ML approach is applicable to microanalysis of experimental data, a situation in which experience (prior knowledge) permits identifiable models and distributional assumptions, PLS models are intended for macroanalysis of complex, multidisciplinary problems (Wold, 1976: 19). PLS "soft" models are data-oriented while "hard" modeling is theory-oriented; where theory is underdeveloped, greater reliance upon data-analysis is required (Wold, 1978a: 4). Theoretical advances and accumulated experience permit statistical analysis and specification of a model's structure, largely a maximum likelihood task, while a theoretically primitive situation requires greater reliance upon causal/predictive specifications, an explicit strength of the PLS technique (Wold, 1978c: 12).

Two examples of PLS modeling are depicted in Figure 1. Causal/predictive arrows are used by Noonan and Wold (1977) in a model of student achievement and by Adelman et al. (1975) in a model of economic growth rates. Manifest (directly observable) variables are indicated by squares, which number three for each circled latent (indirectly observable) variable for diagrammatic convenience. Causal/predictive relationships link manifest to latent variables (outer relations) and interrelate latent variables (inner relations). The causal/predictive complexity of PLS models may range from simple one-block models (one latent variable related to one or more manifest variables) and the principle components case to simultaneous equation structures (Wold, 1978b; Hui, 1978).

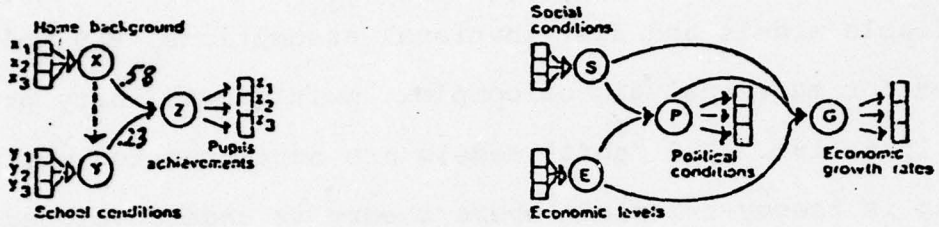


Figure 1
EXAMPLES OF PLS LATENT VARIABLE MODELS:
THREE-AND FOUR-BLOCK CASES

Latent variables are measured within a PLS model, differentiating this approach from ML latent variable models. Each latent variable is a weighted sum of its manifest counterparts. Through iterative steps of ordinary least-squares (OLS) regressions, these weight relations are estimated while maximizing the casual/predictive relationships among latent variables. Methodological details are provided in Rossa et al. (1979), Wilkenfeld et al. (1979), and Wold (1978a, 1978b, 1975), among others. The PLS approach combines measurement theory and explanatory theory to provide consistent parameter estimates and predictive models prior to the availability of highly developed theories and measurements where maximum likelihood techniques are useful.

Appendix F

CROSS-NATIONAL CRISIS INDICATORS PROJECT

LIST OF PUBLICATIONS

RESEARCH REPORTS

No. 1: Paul J. Rossa, "The Cross-National Crisis Indicators Project: Perspectives and Prospects." January, 1978, revised [original, November, 1977].

No. 2: Gerald W. Hopple, "Psychological Sources of Foreign Policy Behavior: Decision-Maker Values and State Outputs." February, 1978.

No. 3: Paul J. Rossa, Gerald W. Hopple, and Jonathan Wilkenfeld, "Interstate and Intrastate Crises: The Nexus in Theory and Practice." February, 1978.

No. 4: Gerald W. Hopple, Paul J. Rossa, and Lilymae Fountain, "Toward an Integrated System of Crisis Warning Indicators: Preliminary Evidence from Pearl Harbor, Korea, and Cuba." March, 1978.

No. 5: Gerald W. Hopple and Paul J. Rossa, "International Crisis Analysis: An Assessment of Theory and Research." April, 1978.

No. 6: Jonathan Wilkenfeld, Gerald W. Hopple, and Paul J. Rossa, "Indicators of Conflict and Cooperation in the Interstate System, 1966-1970." May, 1978.

No. 7: Jonathan Wilkenfeld, Gerald W. Hopple, and Paul J. Rossa, "Bridging the Image-Reality Gap: An Empirical Perspective." June, 1978.

No. 8: Gerald W. Hopple and Paul J. Rossa, "The Internal Situation Profile: Rationale and Preliminary Assessment." June, 1978.

No. 9: Gerald W. Hopple and Paul J. Rossa, "Cross-National Crisis Indicators Project Data Sets Documentation Report." July, 1978.

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1. Joint Research Memorandum No. 1: Judith Daly and Gerald W. Hopple, "Increasing the Sample for the Cross-National Crisis Indicators Project." October, 1977.

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3. Technical Report 78-1: Gerald W. Hopple, Paul J. Rossa, and Jonathan Wilkenfeld, "Progress Report on the Cross-National Crisis Indicators Project." March, 1978.

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1. Research Report No. 2, Presented at the Annual Meeting of the International Studies Association, Washington, D.C., February, 1978.

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3. Research Report No. 4, Presented at the Annual Meeting of the Western Political Science Association, Los Angeles, CA, March, 1978.

4. Research Report No. 5, Presented at the Annual Meeting of the Midwest Political Science Association, Chicago, April, 1978.

5. Research Report No. 7, Presented at the International Conference on Images and Reality in International Politics, The Leonard Davis Institute for International Relations, The Hebrew University of Jerusalem, June, 1978.

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1. Jonathan Wilkenfeld, Gerald W. Hopple, Stephen J. Andriole, and Robert N. McCauley, "Profiling States for Foreign Policy Analysis," Comparative Political Studies, April, 1978.

2. Paul J. Rossa, Gerald W. Hopple, and Jonathan Wilkenfeld, "Crisis Analysis: Indicators and Models," International Interactions, forthcoming.

3. Jonathan Wilkenfeld, Gerald W. Hopple, and Paul J. Rossa, "Bridging the Image-Reality Gap: An Empirical Perspective," In N. Oren (ed.) Image and Reality in International Relations, forthcoming.

4. Jonathan Wilkenfeld, Gerald W. Hopple, and Paul J. Rossa, "Indicators of Conflict and Cooperation in the Interstate System, 1966-1970," in J. David Singer and Michael D. Wallace (eds.) To Augur Well: Early Warning Indicators in Interstate Conflict, forthcoming.

5. Gerald W. Hopple, "Elite Values and Foreign Policy: Preliminary Findings," in Lawrence S. Falkowski (ed.) Psychological Models in International Politics, forthcoming.

6. Gerald W. Hopple, Jonathan Wilkenfeld, and Paul J. Rossa, "Threat and Misperception: Assessing the Overt Behavior of States in Conflict," in Patrick J. McGowan and Charles W. Kegley, Jr. (eds.) Threats, Weapons, and Foreign Policy Behavior, forthcoming.

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NOTE: The following journal abbreviations are used in the references: APSR (American Political Science Review); ISQ (International Studies Quarterly); JCR (Journal of Conflict Resolution); WP (World Politics).

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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER	2. GOVT ACCESSION NO. / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle): FINAL REPORT OF THE CROSS-NATIONAL CRISIS INDICATORS PROJECT	5. TYPE OF REPORT & PERIOD COVERED: Final Technical Report 10/01/77 - 09/30/78
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Gerald W. Hopple	8. CONTRACT OR GRANT NUMBER(s): ONR N00014-76-C-0153
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Department of Government and Politics, University of Maryland, College Park, Maryland 20742	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: Defense Advanced Research Projects Agency, 1400 Wilson Boulevard, Arlington, VA 22209	12. REPORT DATE: December, 1978
	13. NUMBER OF PAGES: 344
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): Office of Naval Research, 800 North Quincy Street, Arlington, VA 22217	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Crisis	Indicator
Crisis warning	Intrastate crisis
Crisis management	Crisis linkage
Events data	Model

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This Final Report summarizes the research findings of the Cross-National Crisis Indicators (CNCI) Project, a research effort which was designed to enhance the crisis warning aspect of the Crisis Management Program of DARPA/CTO. The project emphasized the exploration, development, and preliminary testing of both indicator systems and models designed to facilitate conflict and crisis tracking and forecasting.

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