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PROGRESS REPORT ON THE CROSS-NATIONAL CRISIS INDICATORS PROJECT--ETC(U)
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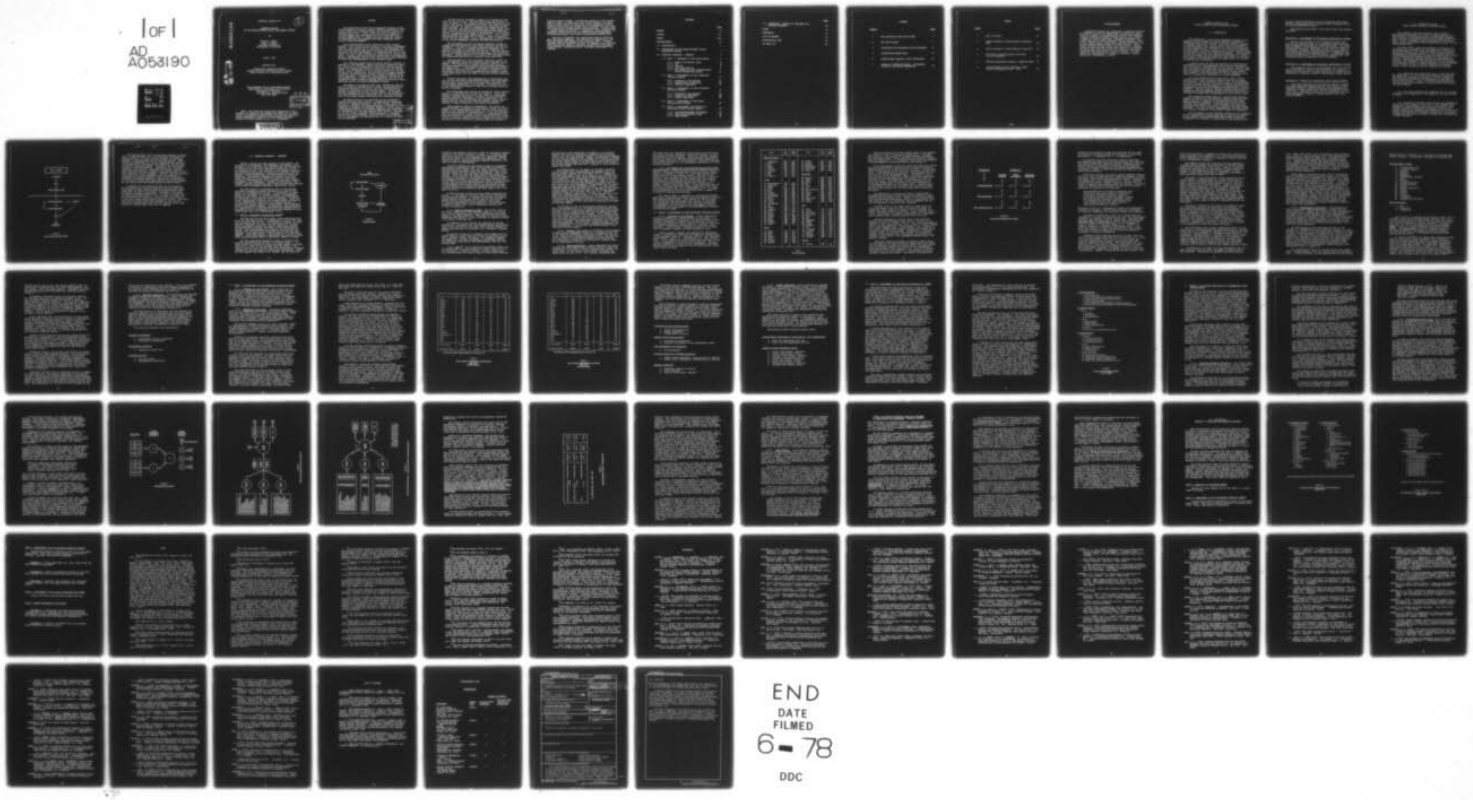

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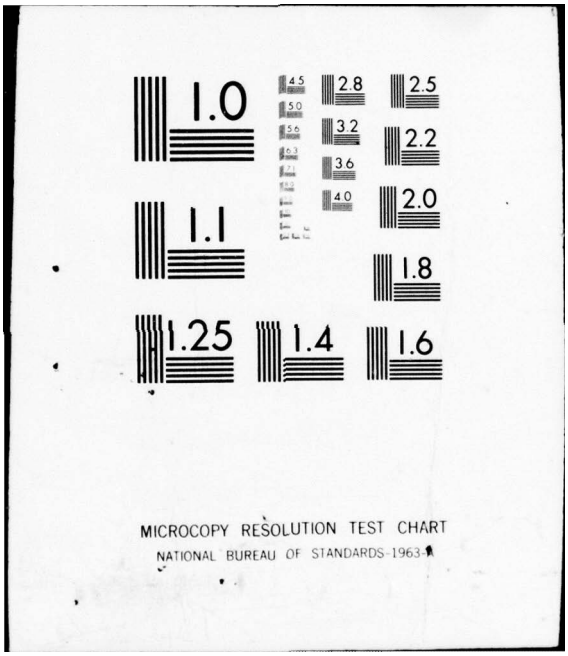
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TECHNICAL REPORT 78-1

PROGRESS REPORT ON THE CROSS-NATIONAL CRISIS INDICATORS PROJECT

by

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University of Maryland

March, 1978

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SUMMARY

The objectives of the Crisis Management Program of the Defense Advanced Research Projects Agency's Cybernetics Technology Office have revolved around two distinct clusters of research activities. First, there has been an emphasis on the development and improvement of crisis monitoring and warning capabilities. A second focus has been the analysis of organizational arrangements and other phenomena which concern crisis management.

The Cross-National Crisis Indicators (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 within states and chronicle the unfolding of events and circumstances in the external arena.

The indicator system would be multi-tiered in nature; in addition to the external, dynamic political indicators which are currently in the DARPA/CTO Crisis Early Warning System, a panoply of internal and external indicators will be incorporated. The development of the indicator system will be supported by the construction and exploration of models designed to specify the potentially complex interrelationships among these indicators. Ultimately, this system of indicators and the specification of their interrelationships will be integrated with other research programs which are currently being conducted within the Crisis Management Program.

The tasks of the CNCI Project thus include the development of intrastate indicators of crises, the development of interstate indicators of crises, and the construction and testing of integrated crisis warning models. Other tasks include expansion of the basic state sample, the updating of the state classification scheme data set, and the illumination of the nexus between intrastate and interstate crises.

The CNCI Project is an outgrowth of the Interstate Behavior Analysis (IBA) Project, a DARPA-funded three-year (1974-1977) research endeavor. The IBA Project, which was designed to construct and operationalize a framework for the comparative analysis of interstate behavior, is the source of a significant portion of the basic research which provides the foundation for the more applied CNCI Project. The tasks of the IBA Project included conceptualization, framework-construction and refinement, data collection and assembly, and the development and implementation of a series of analytical strategies.

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The IBA Project employed a sample of 56 states for the 1966 to 1970 time span. The IBA researchers had decided to adopt 40 events as the minimum criterion for inclusion in the sample; the "major" foreign policy actors were thus automatically included. In order to increase the compatibility between the CNCI and World Event/Interaction Survey (WEIS) data sets, which is utilized by the Early Warning and Monitoring Project at Decisions and Designs, Incorporated, it was necessary to expand the state sample from 56 to 77. Four criteria determined the new sample of 77 states: needs of potential users; the ROZ indicator; testing requirements of participants in the Crisis Management Program; and data availability.

The development of the intrastate indicator system is perhaps the most difficult task which confronts the CNCI researchers. A review of existing research generates the conclusion that there is a marked paucity of conceptual and empirical research in this area of inquiry. Existing indicators in the psychological and societal realms are listed and discussed. Future research will involve the conceptualization and operationalization of an internal crisis data file.

The development of the interstate indicator system is less problematic, given the extensive prior research in this domain. The indicators of foreign behavior received and interstate economic relationships are discussed conceptually and empirically. In the second interstate indicator realm -- the global context or milieu -- two types of indicators are delineated; one refers to international governmental organization memberships and the other to conflict within bordering states.

Salient conceptual and methodological issues which pertain to the CNCI state classification scheme are highlighted. The data set, which consists of 23 discrete indicators for three general dimensions, is described. The potential role of the classification scheme in the crisis warning system is briefly discussed.

The development and testing of integrated crisis warning models is a key objective of the CNCI Project. While substantial progress has occurred in the areas of methodology, specific research techniques, indicator construction and operationalization, forecasting, the computer base, and conceptualization, lacunae and underdevelopment pervade the spheres of model construction and theory development.

Three specific tasks are pinpointed: the search for linkages between interstate and intrastate crises; the development of the action-reaction model; and the utilization of several major theoretical perspectives. It can be concluded that the synthesis of a more creative and comprehensive conceptualization of the domestic crisis milieu with the articulation of testable models provides a productive route to the derivation of more conclusive evidence about the internal-

external crisis linkage. Preliminary research on the action-reaction model is chronicled; this model emerges as a potentially viable source of theorizing on the dynamics of international crises and also yields what is perhaps the core indicator system for crisis warning and monitoring. Several major -- albeit primarily implicit -- models for crisis analysis are discussed; among these are the preconditions/precipitants, diffusion/contagion, and status inconsistency perspectives.

The task of updating the various data sets to 1975 has been virtually completed. The data will be deposited at the CTO Development and Demonstration Facility (DDF). Further research will be conducted in order to complete the tripartite and interrelated tasks of indicator specification and operationalization, conceptualization, and model development and testing.

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PROGRESS REPORT ON THE CROSS-NATIONAL CRISIS INDICATORS PROJECT

1.0 INTRODUCTION

The objectives of the Crisis Management Program of the Defense Advanced Research Projects Agency's Cybernetics Technology Office have revolved around two distinct clusters of research activities. First, there has been an emphasis on the development and improvement of crisis monitoring and warning capabilities.[1] Central to this task is the systematic monitoring of trends, conditions, and events which relate to pre-crisis, crisis, and post-crisis phases. Sub-objectives of the task range from the creative development of a theoretical base concerning the conditions under which crises arise and evolve to the specification and application of a series of quantitative indicators.[2]

A second focus has been the analysis of organizational arrangements and other phenomena which concern the management of crises.[3] Subsumed here is an array of research tasks and activities which highlights the abilities of crisis managers to operate rationally and efficiently during crises. Also relevant is the development of certain technical areas which are potentially applicable to crisis management.

The Cross-National Crisis Indicators (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 within states and chronicle the unfolding of events and circumstances in the external arena.

The indicator system would be a multi-tiered tracking system; in addition to the external, dynamic political indicators which are currently in the DARPA/CTO Crisis Early Warning System, a panoply of internal and external indicators will be incorporated. Such indicators will span the continuum from static attributes to dynamic and fluctuating variables. The multi-tiered, comprehensive indicator system will feature a potpurri of substantive types of indicators.

The development of the indicator system will be supported by the exploration of models designed to specify the potentially complex interrelationships among these indicators. Ultimately, this system of indicators and the specification

of their interrelationships will be integrated with other research programs which are currently being conducted within the Crisis Management Program.

The 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 Crisis Early Warning System.

2.0 FOUNDATIONS OF THE CROSS-NATIONAL CRISIS INDICATORS PROJECT

The Interstate Behavior Analysis (IBA) Project, a DARPA-funded three-year (1974-1977) research endeavor, is the source of a significant portion of the basic research which provides the foundation for the more applied CNCI Project. Figure 1 presents a graphic portrayal of the major stages of the two projects and illuminates the nature of the nexus between them.

The IBA Project, which was designed to construct and operationalize a framework for the comparative analysis of interstate behavior, was firmly anchored in the scientific foreign policy analysis tradition. The research task was consequently cross-national in nature and quantitative analytical strategies were pursued during the final phase of inquiry. Initially, conceptualization and framework-construction and refinement were the central foci of research. Attention then shifted to operationalization and the assembly and collection of data in various internal and external realms. These activities can be summarized as follows:

(1) Conceptual and operational work on the framework was completed.[4] In the course of conceptualizing and constructing and refining the framework, earlier frameworks were evaluated and shown to be inadequate on the basis of one or more criteria. Major conceptual breakthroughs were achieved during the processes of constructing and refining the IBA framework.

(2) Data were collected and assembled for all variable clusters of the framework for 56 states for the period 1966 to 1970.[5]

(3) Analytical strategies were devised and implemented. During this final phase of the Project, the research team analyzed a classificatory scheme of states based on their salient structural attributes,[6] addressed the relative potency question by comparing the interstate and the societal realms,[7] and applied an econometric method for the purpose of assessing the relative potency of predictor variables and variable domains.[8]

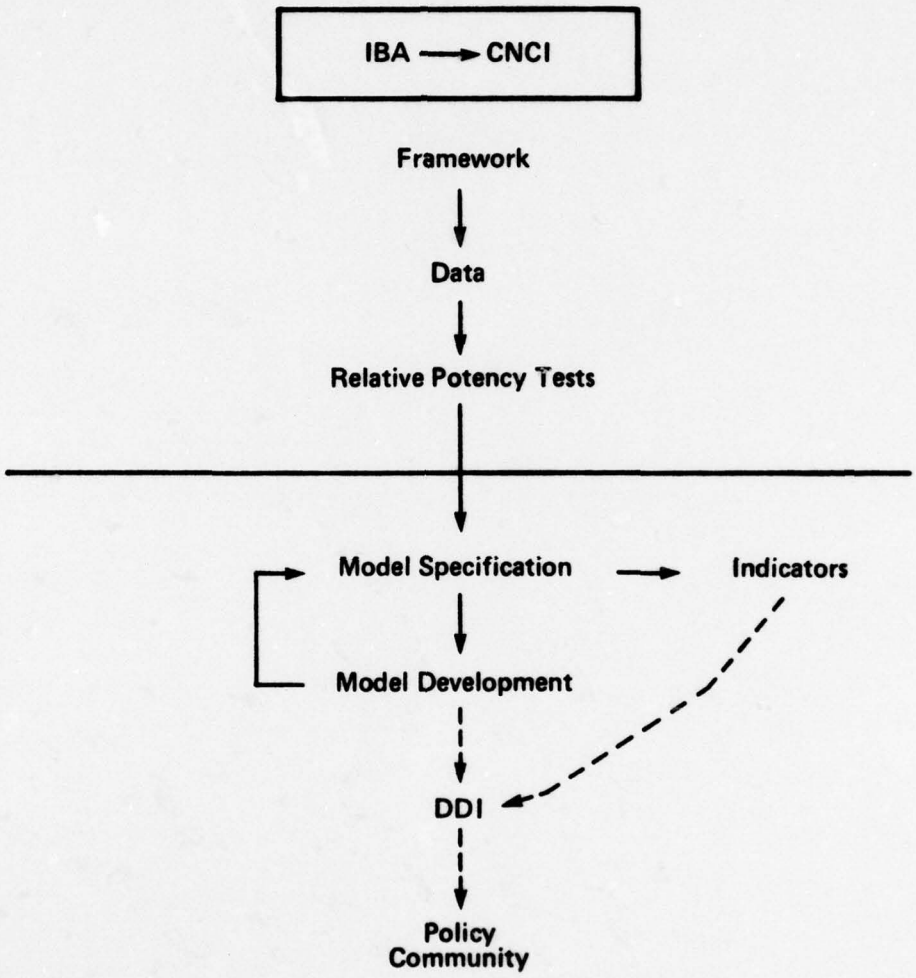


FIGURE 1

The Transition from IBA to CNCI

The CNCI Project, which is much more applied in nature and is concerned explicitly with developing indicators of direct utility in a crisis warning context, is obviously indebted to the preceding work of the IBA Project. That Project's development of a viable classificatory scheme of interstate actors constitutes the foundation for the core of the CNCI indicator system. Similarly, the four general sources of external behavior -- psychological, societal, interstate, and global -- represent the initial variable base from which the CNCI Project's preliminary work on indicator construction has proceeded. Finally, the IBA Project's analytical task, which revolved around the question of assessing the relative potency of the source clusters in explaining interstate behavior, constitutes the foundation on the basis of which more sophisticated interactive models will be constructed and tested during the CNCI Project.

It should also be emphasized that the IBA Project's data assembly and collection operations have yielded what is perhaps the most sophisticated and comprehensive interstate data set which is currently available to the basic and applied research communities. As noted, the IBA data set spans the period 1966 to 1970, includes 56 states, and can be updated and expanded in order to meet the needs of a real-time crisis early warning indicator system. Obviously, the time and effort which were expended in the initial search for existing data sets and data sources can be substantially reduced when a data set is updated.

3.0 TECHNICAL APPROACH: OVERVIEW

Figure 2 depicts the CNCI Project in more detail. As we noted in our proposal (see Wilkenfeld and Hopple, 1977), virtually all of the prior work dealing with 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 communities has conducted extensive research in the realm of economic indicators (see Parker, 1977b).

The CNCI Project is designed to fill in the lacunae and enable analysts to employ indicators of conflict and crisis in all substantive realms. In attempting to accomplish this objective, we intend to devote 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.

3.1 Task 1 - Expansion of the State Sample[9]

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 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 the 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

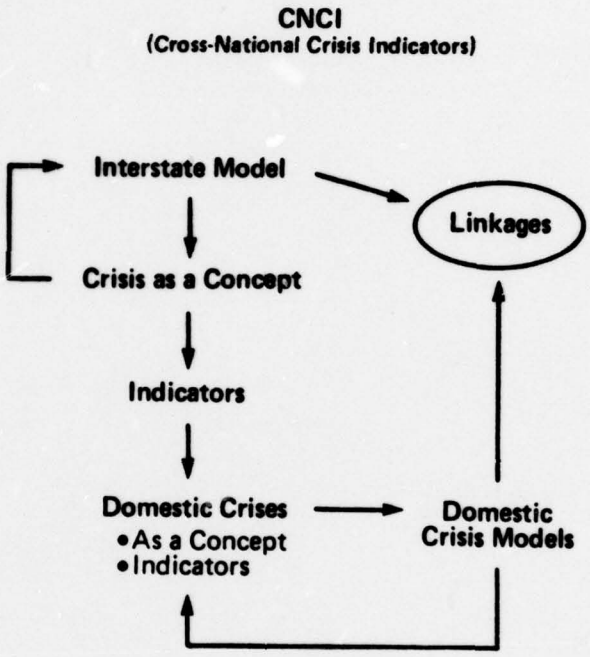


FIGURE 2

The CNCI Project

criterion was somewhat arbitrary, there is appreciable heterogeneity in the list of states. However, it is obvious that very minor states or "micro-states" 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 Project at Decisions and Designs, Incorporated (DDI) 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 Early Warning and Monitoring Projects are involved in the processes of jointly developing and testing indicators of intrastate crises, examining the relationships of these indicactors 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.

3.1.1 Needs of potential users. One of the goals of the joint effort of the CNCI and DDI 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 hot spots which can be expected to remain controversial or explosive (e.g., Rhodesia, Zimbabwe, Angola).

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.

3.1.2. ROZ.[10] - For purposes of the present effort, we can define ROZ ("row percentages and column z-scores")[11] 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 "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 ones which were active during the decade between 1966 and 1976. Several of these states no longer even exist.

As illustrations of the impact of the ROZ criterion, it can be noted that both Rhodesia and Zimbabwe were very active between January 1976 and March 1977.[12] 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 January 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, is therefore used as a criterion for determining which states are or will be of interest to potential users and should consequently 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.[13] 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.

3.1.3. 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 criteron.

3.1.4. 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/DDI 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.

3.1.5. 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 1.[14] Asterisks denote states which were not in the original sample. The list is the product of DDI 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), it was 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.

The list in Table 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.

3.2 Task 2 - Development of the Intrastate Indicator System

3.2.1. Overview of the problem. Crisis research has obviously emerged as a viable subfield in the domain of international political analysis; the proliferation of case studies, frameworks, propositional inventories, panels at professional meetings, special issues of journals, and calls for theory-building all demonstrate the validity of this assertion. Unfortunately, comparable research on the subject of domestic "crises" has been regrettably rare.

Recent inquiry, however, has generated an impressive number of theoretical frameworks and empirical propositions in the amorphous realm of "internal conflict" and "aggressive participation" (see, e.g., Feierabend et al., 1972; Muller, 1977). Such research has obvious potential relevance to the study of indicators of domestic crisis behavior. The tripartite breakdown of crisis warning, management, and abatement/resolution can be applied to both interstate and intrastate crisis research.

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*	555	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
			70. Cambodia	811	CAM
Africa:			71. Laos	812	LAO
			72. N. Vietnam*	816	VTN
33. Ghana	452	GHA	73. S. Vietnam	817	VTS
34. Nigeria	475	NIG	74. Malaysia	820	MAL
35. Zaire	490	COP	75. Philippines	840	PHI
36. Uganda *	500	UGA	76. Indonesia	850	INS
37. Kenya	501	KEN			
38. Tanzania *	510	TAZ	Oceania:		
39. Somalia*	520	SOM			
			77. Australia	900	AUL

Table 1

LIST OF STATES

From the perspective of the international crisis analyst, the interest is not in intrastate crises per se. Instead, the focus is on the subject of linkages between intrastate and interstate crises. Given the trilogy of warning, management, and resolution, it is possible to delineate nine possible "foreign-domestic" interaction points (see Figure 3).

Pre-crisis phases at both the state and interstate levels may feature behavioral sequences which ultimately converge toward crises at one or both levels of warning. Crises which occur simultaneously within the state and externally have obvious -- and potentially disastrous -- consequences for the dual sets of crisis management tasks. Pre-crisis or post-crisis stages at one level may create distinctive management patterns for decision-makers who are managing a crisis at the other level. Alternatively, crisis management at one level may impinge upon the process of crisis development or abatement/resolution at the other level. Finally, post-crisis phases at both the interstate and intrastate levels may have ramifications for the dual post-crisis resolution processes.

The depiction of linkages in Figure 3 constitutes a conceptually exhaustive delineation of the potential intrastate-interstate crisis nexus. Whether all of the linkages are also manifested empirically cannot be ascertained, given the paucity of data on intrastate crisis phenomena and the lack of systematic tests for such linkages.

Orlansky (1970: 9-10) notes that one study lists 380 conflicts between 1946 and 1964; 85 percent of these, he emphasizes, were internal in nature. Of the internal conflicts, 40 percent were classified as coups, military revolutions, and mutinies, 30 percent constituted civil disorders, and 12 percent were internal guerilla and civil wars.

Existing research on internal crises has virtually equated the latter phenomena with internal conflict or instability (see, e.g., Banks, 1971).[15] Data sets consequently consist of such discrete event items as riots, general strikes, coups, and assassinations. Prior research (e.g., Hopple et al., 1977b) suggests that internal turmoil and unrest can be clustered into two broad realms: governmental instability (coups, changes in the executive, changes in the cabinet, changes in the constitution, revolutions, and purges) and societal unrest (riots, anti-government demonstrations, and general strikes).

The first dimension subsumes instability events which are confined to the formal political system while the second cluster 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 counterelite) and extra-systemic violence and unrest. One salient classificatory

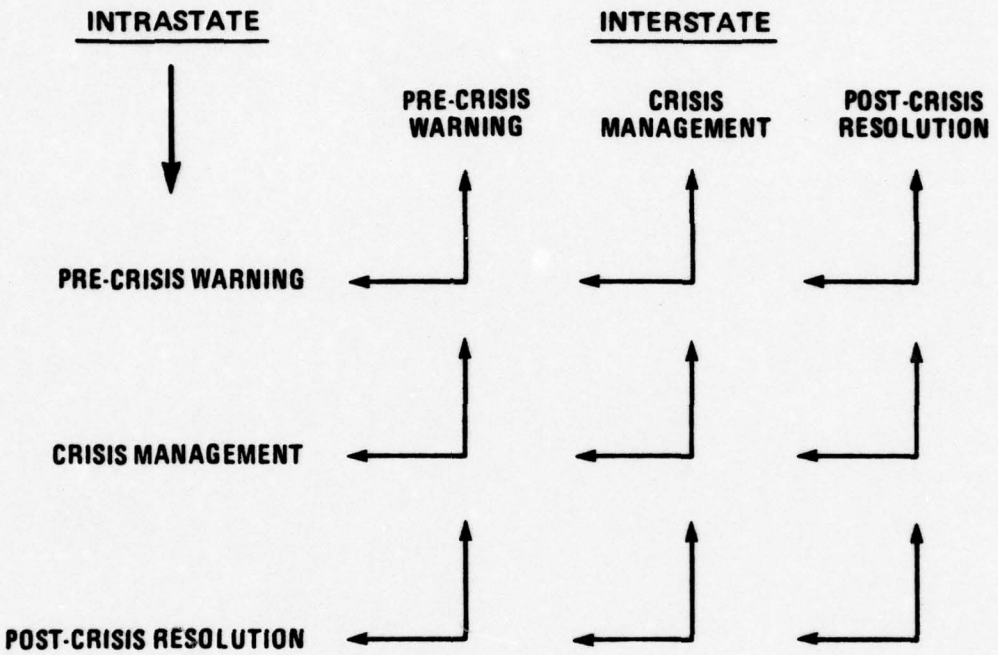


FIGURE 3

Interstate and Intrastate Crisis Linkages

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).

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 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, 1978; McClelland et al., 1976). Although D-files do not profile "crises" directly, the data are designed to monitor and forecast stress and tension. McClelland (1978: 6) advances this rationale for the use of prestige newspapers as sources for D-files data:

> News organiztions 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.

McClelland (1978: 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 (1978: 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, disorders, 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, 1978: 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 scale 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, 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* analogues of 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.

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 checklist 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 crisis 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.

The CNCI Project will devote considerable effort to the objectives of conceptualizing and operationalizing an internal crisis data file. Subsequent research will undertake the task of defining the phenomenon of intrastate crisis behavior in a systematic, coherent fashion. Related to this central objective will be the subsidiary research goal of developing a typing scheme based on such attributes as time span, the range of issues, and the range of actors. We also expect that the IBA-CNCI state classificatory scheme will be of utility in our efforts to monitor and analyze internal crises.

In addition to the range of actors and groups, the time span, and the range of issues, the <u>type</u> of issue may be 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.

3.2.2. Psychological indicators. The psychological realm constitutes a fascinating area of inquiry for the crisis analyst.[16] Shapiro and Gilbert's (1975) comprehensive literature review suggests that individual (psychological) and small group (social psychological and sociological) research is clearly relevant to the task of crisis management. Given the impact of high-level elites in the crisis milieu,[17] political psychology can be expected to contribute to the analysis of sources of and decision-making processes associated with crisis phenomena.

For the purpose of cross-national analysis in the context of a comprehensive crisis indicator system, the CNCI project will utilize a data set which was originally collected in order to operationalize the psychological realm of the IBA framework. The case study literature in the area of foreign policy elite analysis is both voluminous and unsystematic.[18] However, the explicitly comparative work is almost nonexistent. 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.[19]

The psychological data set includes two distinct components: decision-maker values and decision-maker characteristics. In both instances, we have amassed data for the foreign

policy elite of the state (i.e., the head of state and the foreign minster). The specific variables are listed below.

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. Progess
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 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).

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.[20]

Preliminary descriptive data and analytical results for the value data set are reported in Hopple (1978). The most pertinent findings concern the impact of decision-maker values on external behavior. In a multiple regression analysis in which the 18 values were employed as predictors of foreign behavior, the values accounted for almost 40 percent of the variance in the case of diplomatic behavior and almost 25 percent in the case of non-military conflict behavior. The 18 values accounted for 19 percent of the variance in force behavior.

Since indicators from the psychological or elite-level domain obviously constitute only one cluster of determinants in the analysis of foreign behavior, a second series of multiple regression analyses was undertaken. Societal, interstate, and global indicators were incorporated into the analyses. Included were the 18 decision-maker values, 4 societal factors, 11 interstate variables, and 10 global indicators.[21] There were thus 43 discrete indicators from four distinct predictor domains.

Several of the individual values were substantively and statistically significant.[22] The most noteworthy finding was the fairly strong nexus between ideology and non-military conflict (beta weight = -.25). A large number of references to ideology thus predicted a low level of non-military conflict, suggesting that decision-makers may sometimes substitute rhetorical flourishes for negative acts directed toward other states.

Generally, however, the initial results were not duplicated in the more comprehensive analysis. The pervasiveness of the action-reaction syndrome attenuated the potential impact of other determinants. Few societal, interstate, economic, or global indicators related significantly to the dimensions of foreign behavior. The linkage between behavior received and behavior sent, in contrast, was both robust and positive. The action-reaction relationships involving the diplomatic behavior and force dimensions were especially striking in magnitude.

Subsequent analysis will be conducted in order to assess the value data set. The Rokeach value approach as applied to elite foreign policy analysis constitutes a parsimonious, flexible, and potentially viable method for content analyzing public documents and generating decision-maker indicator data. Additional descriptive and analytical strategies will be pursued. Most problematic is the issue of the relevance of the

value data for monitoring crisis behavior. Given the plethora of obstacles to generating valid and reliable indicators in the realm of elite characteristics, it would be advisable to continue the process of assessing the data set.

3.2.3. Societal indicators. Five indicators are employed to operationalize the societal realm. First, economic performance is tapped by two discrete indicators: merchandise balance of payments and percentage of unemployed.[23] Secondly, the demographic situation is profiled with a population growth rate indicator. The fourth and fifth indicators, which reflect civil violence and internal conflict, are labelled "societal unrest" and "governmental instability."

As noted earlier, we discovered that the internal instability dimension can be clustered into two broad realms. Using 12 domestic events indicators from the Banks (1971) data set, we generated crosstabulations which revealed that riots, strikes, and demonstrations formed a spontaneous, mass "factor" (societal unrest) while revolutions, purges, and changes in the cabinet, executive, and constitution constituted a distinct "governmental instability" index.

The 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

3.3 Task 3 - Development of the Interstate Indicator System

3.3.1. 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.

3.3.2. 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.[24]

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.[25]

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; Kegley et al., 1975). As noted earlier, the World Event/Interaction Survey (WEIS) data set is the source for the core indicators in the extant Early Warning and Monitoring Project at Desisions and Designs, Incorporated.

The WEIS data are available on a continuous basis from January of 1966 to the present. The WEIS coding rules and routines (see McClelland and Young, 1969) have also been employed to generate events data for four disparate historical crisis cases: the German invasion of the Soviet Union in 1941; the Japanese attack on Pearl Harbor in December of 1941; the outbreak of the Korean War in June of 1950; and the Cuban missile crisis in 1962.[26]

Data were collected for the principal actors in each crisis and spanned a period from 18 months prior to the crisis to one month subsequent to the crisis. The entire data set for the four historical cases includes thousands of discrete events. In the Pearl Harbor case, for example, six senders (the United States, Britain, Germany, Italy, the Soviet Union, and Japan) sent 3851 events to each other. The Korean War case contains 771 events for five actors (the U.S., U.S.S.R., China, North Korea, and South Korea).

During the Cuban missile crisis time frame, 937 events were sent among the three core states (Cuba, the U.S., and the U.S.S.R.).

The 1966 to 1970 WEIS data set was used to delineate core interstate political indices. Results for a factor analysis of the WEIS behavior received data are presented in Table 2.[27] 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 2 are compared to those in Table 3.[28] An inspection of the loading patterns in the latter table highlights the difference between the two realms. The first factor in Table 3, 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 beahvior" -- 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.[29] 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. Furthermore, analysts must take into account multi-state arrangements and individual state policies, long-term and short-term conditions and cycles, and the inescapable confusion of political with economic aspects of interstate relationships.

	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 2

Factor Analysis of WEIS Behavior Received Data
1966–1970
Varimax Rotation

	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.

TABLE 3

Factor Analysis of WEIS Behavior Sent Data
1966–1970
Varimax Rotation

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 the absolute and relative importance of various types of exchange. 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.

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

3.3.3. 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 textual variables or rules and norms of the global system.[30] 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 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 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 between 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)

3.4 Task 4 - Development of the State Classification Scheme

The development and operationalization of the state classification scheme is discussed in detail elsewhere.[31] 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 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 characteristcs 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.[32]

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.[33]

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 4.

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., 1978). 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 subsystem of the envisioned Cybernetics Technology Office early warning 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 characteristcs of the participants. Data on such indicators as GNP, energy consumption per capita, total area, total population, military manpower, 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., 1978) 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 influence crisis behaivor? 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. *Economic Dimension*

1. Gross National Product
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 4

Structural Characteristics of States: List of Variables

3.5 Task 5 - Development and Testing of Integrated Crisis Warning Models

Progress in the analysis of crisis phenomena has been sporadic and ad hoc in nature. The research armamentarium in this field of inquiry has undergone a veritable explosion. Basic methods range from case studies and comparative case studies to the construction and application of analytical frameworks.[34] Specific techniques for acquiring data and for conducting crisis monitoring and analysis activities have experienced a similar proliferation. Examples include content analysis, simulation, the events data approach, and interviews.[35] Furthermore, developments in the arenas of indicator construction and operationalization, forecasting, and computerized techniques for the storage, retrieval, manipulation, and display of data have been auspicious.[36] In addition to the propitious developments on the methodological, indicator development, forecasting, and computer base fronts, substantial conceptual work has also been completed.[37]

Lacunae and underdevelopment, however, pervade the analytical spheres of model construction and theory development. The charges that the subfield of crisis analysis is "theory barren" and that other social theories have failed to accommodate the concept are as valid today as they were when Robinson (1972: 27) articulated them in his assessment of the state of theory in crisis research. In the more general field of foreign policy and interstate conflict analysis, the question of the relative potency of competing explanatory variable clusters has been considered.[38] Crisis analysts have not even confronted this preliminary issue.

The development and testing of integrated crisis warning models constitutes a significant component of the CNCI Project's research agenda. Figure 2 shows that work on interstate and domestic crisis models constitutes 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.

3.5.1. Interrelationships and models. The latter focus is one which has elicited the attention of various researchers in the past. As we noted in our discussion of the intrastate indicator system, the phenomenon of intrastate crisis has rarely been operationalized directly and can be treated only in the context of data sets which measure domestic conflict behavior.

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.[39] The linkage has also been measured in varying regional arenas and cross-national contexts.[40]

The most charitable judgment would be that this stream of inquiry has yielded inconclusive results. Few of the studies 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.[41]

Our 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,[42] 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 serious 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 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 abondoned 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.

3.5.2. 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.[43] During the first two quarters of the current contract year, we have conducted further research on the action-reaction perspective which constitutes a primary model for our subsequent analyses of international crisis behavior. The background research and preliminary analytical results will be briefly chronicled here.

In order to identify the indicators which presumably warrant more detailed scrutiny in terms of their potential for crisis warning, we undertook the task of estimating the relative potencies of sets of indicators. The sets were defined by cluster and included the societal, interstate, and global realms.[44] The purpose of the analysis was twofold: to identify the realm(s) which contain the key indicators for explaining foreign behavior in general and to pinpoint the specific indicators within that realm which appear to be the most helpful.

We have utilized for this purpose some recent methodological developments from causal modeling and econometrics. The latent variable -- a stand-in for a block of variables -- is the central concept in this approach. We allow each component of the model to represent such a latent variable, and the indicators within the component serve as the block of observed (manifest) indicators for the latent variable. This variable is "specified in terms of the parameters of the model and the directly observed variables (Wold, 1974: 70)." According to Adelman et al. (1975: 4-5), interactions among the variables in each block are left unspecified and are estimated without prior restriction.

In the current analysis, four latent variables are defined. The global, interstate, and societal components represent three latent independent variables. The foreign behavior realm constitutes the fourth, dependent latent variable. Each latent variable is defined as a weighted interaction of its manifest indicators, where weights are determined as estimated parameters in the model.

Accompanying this unusual treatment of variables is a difference from the typical mode of relating them. The structural specification of the model relates blocks of variables rather than single variables (Adelman et al., 1975: 4-5). That is, the latent variables, which are specified as linear combinations of manifest variables, are linearly interrelated.

The fitting of a latent variable model to the measurable reflects the blend of complexity and simplicity which characterizes this approach. Since relationships involve both unknown parameters and unknown variables, the problem of estimation is nonlinear (Wold, 1974: 71). This nonlinearity problem is solved through an iterated series of estimations, each confronting a portion of the model (which is linear in isolation) with ordinary least squares regression:

> Each such regression gives proxy estimates for a subset of the unknown parameters and latent variables..., and these proxy estimates are used in the next step of the procedure to calculate new proxy estimates (Wold, 1975: 71).

The cyclical procedure, called NIPALS (Nonlinear Iterative Partial Least Squares), stabilizes until consecutive estimates do not significantly differ.[45] Figure 4 depicts the NIPALS model in the case of two independent latent variables.

Figure 5 provides a graphic representation of the NIPALS model which is used in our analysis. Three latent independent variables are specified: global; interstate; and societal. 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.[46]

Figure 6 presents the results of the model test. 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

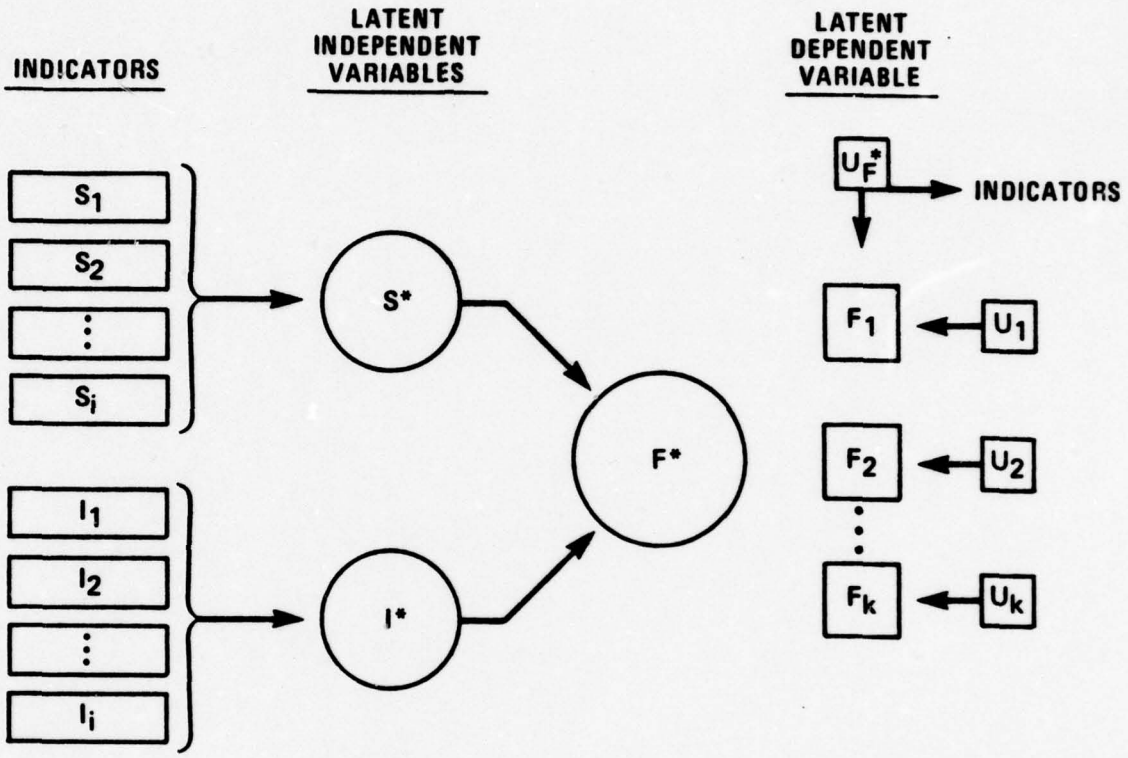


FIGURE 4
Generalized NIPALS Model

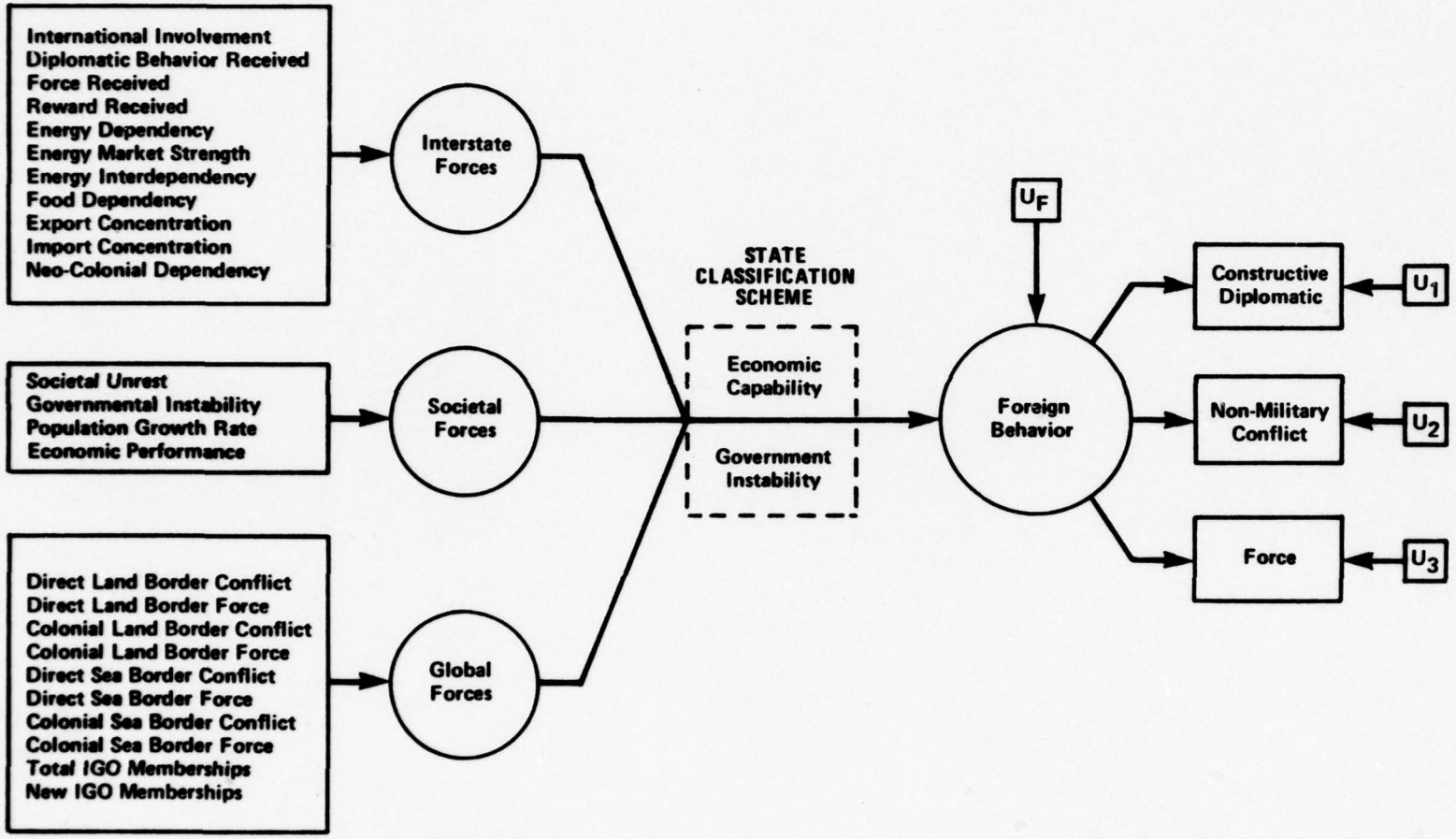
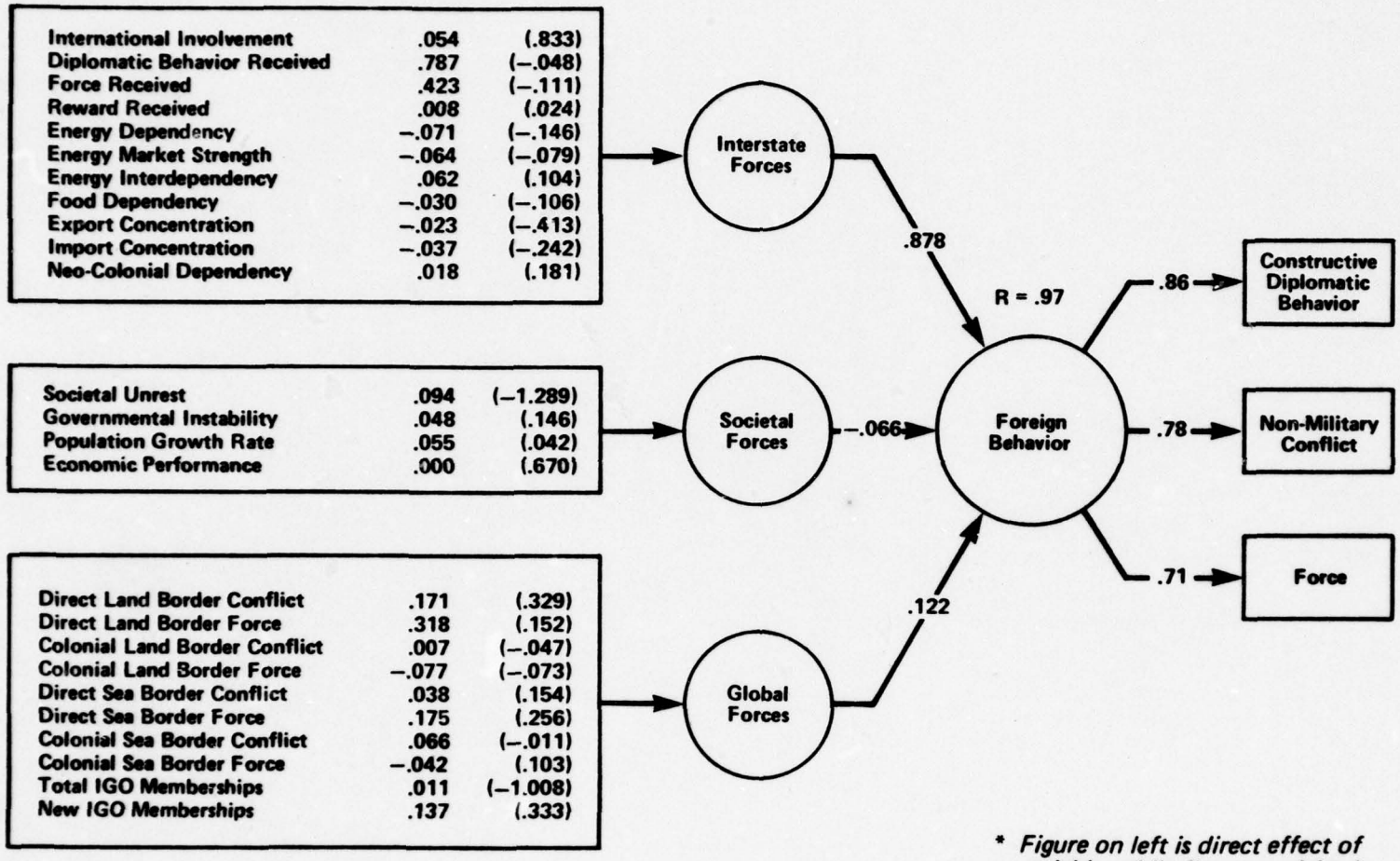


FIGURE 5

NIPALS Model Applied to CNCI Indicators



* *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

Results of NIPALS Analysis: Interstate, Societal, and Global Components*

impressive, although the latter is nevertheless explained rather well.

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 indicators 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 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.

The findings of the relative potency tests generated by the NIPALS model reveal both the universal importance of diplomatic and force behavior stimuli and the variability of other explanatory factors. This "action-reaction" model clearly emerges as the candidate for the "core" system of indicators of interstate crises. We shall present below some preliminary findings regarding the interrelationships of these indicators.

The most direct method of ascertaining these relationships is through multiple regression analysis. These results, which are reported in Table 5, suggest that the "core" indi-

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.)	F = 7621

**N = 280 (56 states, years 1966–1970).*

TABLE 5

Multiple Regression Results: Behavior Sent*

cators 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 NIPALS model which contained more variables but allowed less specificity.[47]

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 the expected positive and negative effects.

A more detailed inspection of these results reveals two major processes within the indicator system.[48] First, we may refer to a "force spiral" in which the state becomes enmeshed 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 which tend 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 outweighted by the mollifying effects of rewards upon force behavior, which, when reduced, further spurs constructive action and retards conflict and force.

A noteworthy gap in the indicator system is indicated by the failure to explain 57 percent of the variance in nonmilitary conflict behavior. The action-reaction model must be supplemented to account for this form of behavior.[49] 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.

The action-reaction model will be analyzed in subsequent research with data on international crises. We also intend to refine the action-reaction model which has appeared with such regularity in the research literature on foreign policy and conflict behavior. While the conflict received/conflict sent nexus is robust, this finding is neither astonishing nor helpful to theorists or policy analysts.

The extent to which the process is automatic is the key issue. Is a crude, mechanistic stimulus-response model sufficient? If decision-maker perceptions and other decision context variables intervene, how do these phenomena impact upon or modify the relationship? Does the strength of the action-reaction linkage vary by type of issue, type of conflict, type of state or dyad, etc.? These neglected questions will be explored by elucidating and testing more sophisticated models and by employing various crisis data sets.

3.5.3. Other models. In the area of research strategy, we plan to develop and apply more fruitful procedures for the exploration of empirical relationships in the foreign conflict and crisis realms. In the past, we have not been reluctant to derive or employ techniques which suit the particular needs of our analysis; this explicit emphasis on correspondence between substantive requirements and methodological applications will continue.

The desire to capture the complexity of crisis situations will lead us to the causal modeling approach to causal analysis.[50] Our emphasis on assessing the relative explanatory power of various source clusters constitutes the preliminary stage for a causal modeling approach. Although inquiry which attempts to "rank" determinants is extremely important, such research is or should be viewed as the foundation for identifying the contributions of each posited predictor variable. Research by Jencks (1973) and others illustrates that causal modeling can be employed in policy-relevant inquiry.

While we would argue that causal analysis is of value even if it is primarily heuristic in nature, it should also be recognized that other elements of the research and theory-construction processes cannot be neglected. As Asher (1976: 10) cautions:

> ...the success of one's data analysis depends upon proper execution of all the steps in the research process prior to the analysis stage. In fact, I would go so far as to argue that if one's causal analysis goes astray, it will more likely be due to carrying out the earlier steps in the research process poorly rather than to any misuse of the techniques which are relatively straightforward and easily learned. Poor theory, unsatisfactory operational definitions, and the like are more

likely to frustrate analysis than any mistakes in application of techniques. [Emphasis added.]

The significance of conceptualization, indicator specification, and other preliminary research activities cannot be denied. The delineation of viable theoretical perspectives -- a precondition for more sophisticated theory-testing -- will be discussed below.

We also intend to emphasize the development of regional interaction group models. Instead of adopting the typical "most similar systems" research design, in which causal mechanisms are assumed to be universal, we will attempt to deal with the many discontinuities in the international system (see Young, 1973).

In order to avoid both idiosyncratic case studies and the nomothetic image of theory, the CNCI Project will focus upon the dynamics of conflict and crisis within regional interaction groups of states and relate these findings to work of more global significance. The Middle East regional interaction arena, for example, will be analyzed as an interaction group phenomenon which is separable from causal relationships which are more general in scope and external to that arena.

In addition to the action-reaction model, various other theoretical perspectives can be identified in the literature on conflict and crisis. While these perspectives are often implicit and are frequently articulated in a diffuse fashion, sufficient progress has occurred to permit some preliminary empirical analysis in each of the three domains discussed below.

One area which we posit to be critical in the realm of crisis analysis involves the crucial distinction between those factors which can be viewed as the basic underlying preconditions of crises and those determinants which are precipitants -- or immediate precursors -- of crises. Eckstein (1965) originally developed and applied this distinction to the study of internal war.

As Eckstein points out, the most noteworthy contribution of this distinction is that it shifts attention from factors which cannot be analyzed systematically as a result of their uniqueness to those which are amenable to systematic inquiry. Most of the foreign policy research in the events data tradition has concentrated on precipitants and neglected the preconditions which constitute the necessary conditions for the occurrence of conflict or crisis.

A viable indicator system will include preconditions (i.e., static attributes) as well as an array of precipitants (i.e., dynamic or fluctuating indicators). While the latter are often more amenable to decision-maker intervention, both types are important for explanation and prediction.

A considerable amount of theoretical and empirical work has been done across a variety of disciplines on the phenomena of diffusion and contagion. Our intention is to ascertain the extent to which these types of processes apply to foreign conflict and crisis phenomena as well.

With regard to the process of diffusion of innovations, this work has involved the consideration of four distinct sets of variables: (1) the innovation; (2) the channels of transmission; (3) the spread of diffusion over time; and (4) the members of a system among whom the innovations spread. Almost no work has been done at either the theoretical or empirical levels on the extent to which these types of processes characterize the crisis behavior of states. Yet a careful reading of this literature indicates a great deal of potential for the transfer of portions of this theoretical perspective to the domain of crisis analysis.

If conflict and crisis are conceptualized as "innovations," the principles of diffusion research can be applied to this area of inquiry. Such independent variables as the characteristics of the various innovations, the various sources and channels of information and influence, the social structure of the adopter population, and the characteristics of potential adopters should be investigated.

Prior inquiry shows that the rate of diffusion is generally S-shaped; the process begins slowly and then increases with a gradually accelerating rate. Furthermore, the cumulative diffusion rate sometimes approaches or approximates a normal curve. To the extent that these generalizations also characterize the diffusion of innovations in the realm of conflict and crisis, these processes will be much more amenable to prediction and explanation.

Research designs which emphasize the diffusion perspective would require the utilization of a variety of techniques and disciplines. Relevant areas of inquiry would include psychology, social psychology, sociology, political science, and statistics. Analyses will be pursued on within-systems, cross-national, and international bases.

With regard to contagion, the question for the social scientist is whether the patterns of increases and decreases in certain types of conflict and crisis behaviors follow certain rules which can be identified and described. One model with potential value involves the concepts of contagion and epidemics. There has been a considerable amount of work by mathematicians on epidemics, fads, rumors, and other types of mass behavior, in an effort to identify consistent patterns which characterize these different phenomena. Such notions as the nature of the transmission, differences in susceptibility, temporal elements, the development of immunity, and the process of termination have been examined. From these

characteristics, mathematical models have been developed to fit the various stages of contagion.

While mathematical models of contagion have been developed most elaborately in the biological and medical sciences, there has been at least one notable effort to apply these notions to international events. Specifically, Lewis F. Richardson (1960) developed a mood theory of war, drawing upon the types of notions developed above to provide a quantitative picture of war moods in Great Britain and Germany immediately before, during, and immediately after World War I. It is our expectation that these notions can be successfully applied to conflict and crisis, particularly in tracking the origin, development, spread, and decline of certain types of action.

A third area of theory from which we expect to develop models of foreign conflict and crisis behavior deals with the notion 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.

It is our intention to integrate the notion of rank disequilibrium into our analytical scheme in the form of relational considerations. Thus, the structural attributes utilized in the development of the classificatory scheme for foreign policy actors will be employed in this context as relational attributes, with each state scored on each status dimension. Furthermore, states will have status ranking on both the global and regional levels, in an effort to assess the impact of perceived status inconsistency on foreign conflict and crisis behavior. As indicated above in connection with the other perspectives to be investigated, an effort will be made to integrate the status inconsistency notions with other concepts and perspectives.

4.0 CONCLUSION: SUMMARY OF COMPLETED AND PROPOSED RESEARCH

The Cross-National Crisis Indicators Project involves an effort to synthesize and extend our earlier work and the research of others in the pursuit of the goal of a crisis indicator system and in the development and testing of integrated crisis warning models. We view the tripartite tasks of indicator specification and operationalization, conceptualization, and model development and testing as interrelated objectives which should be pursued simultaneously and coordinated explicitly. According to Figure 2, we envision feedback loops which link the processes of indicator delineation and conceptualization.

We have virtually completed the task of updating our various data sets to 1975. The data will be deposited at the DARPA/CTO Development and Demonstration Facility (DDF); we also plan to produce a detailed data documentation report for crisis analysts who use CNCI data in basic or applied research activities. Table 6 lists the existing indicators.

The action-reaction model has been analyzed in detail. Subsequent research will involve the collection of additional data sets and the refinement and testing of a series of crisis models. We will also attempt to develop a prototype data analysis system, employing existing CNCI data sets and several external crisis data sets (derived from the WEIS data set and the CACI [1975] and perhaps Butterworth [1976] crisis inventories). Basic CNCI tasks are summarized below.

Task 1 - Expansion of the State Sample

*Extend the state sample from 56 IBA cases to a larger number of states.

Task 2 - Development of the Intrastate Indicator System

*Conceptually develop indicators of crisis at the intrastate level. These will include indicators of internal political, social, and economic instability.

A. Psychological Component

a. 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

b. Elite Attributes
   1. Age
   2. Education
   3. Occupation

B. Interstate Component

a. International Involvement
   1. Total trade
   2. Imports
      a. Food
      b. Beverages, Tobacco
      c. Mineral Fuels
      d. Animal, Vegetable Oil, Fats
      e. Chemical
      f. Basic Manufactures
      g. Machines and Transport Equipment
      h. Miscellaneous Manufactured Goods
      i. Other
   3. Exports (see imports list)
   4. Energy trade
      a. Total primary energy produced
      b. Energy imports
      c. Energy exports
      d. Total energy consumed

b. Behavior Received*
   1. Diplomatic behavior received
   2. Force received
   3. Reward received

**Data for the behavior received indicators are from the world Event/Interaction Survey (WEIS).*

TABLE 6

Cross-National Crisis Indicators (CNCI) Project Indicators (1966–1975)

C. *Societal Component*

a. Economic Performance
   1. Merchandise balance of payments
   2. Percentage of unemployed

b. Demographic situation
   1. Population growth rate

c. Domestic conflict**
   1. Societal unrest
   2. Governmental instability

D. *Global Component*

a. International Governmental Organization (IGO) Membership
   1. Total IGO memberships per year
   2. Total new IGO memberships per year

b. 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)

***Data are from Arthur Banks's (1971) cross-national data set.*

TABLE 6 (cont'd)

Cross-National Crisis Indicators (CNCI) Project Indicators (1966–1975)

Task 3 - Development of the Interstate Indicator System

*Conceptually develop indicators of crisis at the interstate level. These will include indicators sensitive to economic, military, and political phenomena.

Sub-Task a - Create data sets for 2 and 3 which span the period 1966 to the present.

Sub-Task b - Conduct retrospective testing of the indicator systems with past conflict and crisis situations.

Sub-Task c - Integrate the interstate and intrastate indicator systems into the computer-based early warning system.

Task 4 - Development of the State Classification Scheme

*Update the state classification scheme data set.

Task 5 - Model Development and Testing

Sub-Task d - Develop and test models of interstate conflict and crisis, beginning with the action-reaction, preconditions versus precipitants, diffusion and contagion, and status inconsistency and aggression perspectives.

Sub-Task e - Integrate the models into the computer-based crisis early warning system.

NOTES

[1]See Andriole and Young (1977), Andriole (1976), and Daly (1978).

[2]On the subject of international crisis analysis in general, see Hermann (1969, 1972, 1975), McClelland (1961), Parker (1977a), Young (1968), and Young (1977). Theories are discussed in Robinson (1972) and Hopple et al. (1978a). Quantitative indicators may be external or internal and can be arrayed along a static-dynamic continuum; substantively, indicators may be military, political, or economic in nature. In the extant DARPA/CTO crisis warning system, dynamic political indicators from the external realm are derived from the World Event/Interaction Survey (WEIS) data set. These indicators are discussed in Andriole and Young (1977: 118-119), Daly (1977b), and Daly and Bell (1977a, 1977b). Crisis data sets are the subject of Brecher (1977), Butterworth (1976), CACI (1975), and Hopple et al. (1978b). Other indicators are discussed in Rossa et al. (1978) and in this Report. In addition to quantitative indicators, the crisis warning system consists of quantitative indicators of U.S. military, political, and economic interests abroad (see Martin, 1976, 1977), a unified multi-method forecasting ability (see Andriole, 1976 and Decisions and Designs, 1977), and a computer base (see Decisions and Designs, 1976). Software programs are described in Bell (1978) and Wittmeyer (1976). On the subject of the development of computerized techniques for the storage, retrieval, manipulation, and display of data, see also Bobrow and Schwartz (1969) and McClelland et al. (1971).

[3]Crisis management is the subject of Candela (1974), CACI (1977), and Hazlewood et al. (1977). A propositional inventory of social and psychological factors is available in Shapiro and Gilbert (1975). On the subject of crisis management and computers, see Bloomfield and Beattie (1971).

[4]See Andriole et al. (1975a, 1975b).

[5]Details are provided in Wilkenfeld et al. (1977b), Hopple et al. (1977c), Fountain and Rossa (1977), Rossa and Fountain (1977), and Hopple (1977, 1978).

[6]The state classificatory scheme is described and analyzed in Wilkenfeld et al. (1978), Wilkenfeld and McCauley (1976), and Rossa (1976).

[7]The major example is Hopple et al. (1977b); see also McCauley (1977).

[8]See Wilkenfeld et al. (1977a), Hopple et al. (1977a), and Wilkenfeld (1978).

[9]See Daly and Hopple (1977).

[10]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).

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

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

[13]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.

[14]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.

[15]See Orlansky (1970: 25-40) for a review of research on domestic conflict and factor analytic searches for dimensions of the latter phenomenon. Specific research includes Rummel (1963, 1966), Tanter (1966), Feierabend and Feierabend (1966), Banks (1972), Nesvold (1971), and Gurr (1967, 1968a, 1968b, 1970). 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). The more generic concept of aggressive participation is discussed in Hibbs (1973) and Muller (1977: 71-86).

[16]The literature on psychology and foreign policy analysis is discussed briefly in Hopple (1978: 3-5) and in detail in Hermann (1977); Marvick (1977) presents an excellent review of the research in the general field of "elite studies" and Greenstein (1975) explores the interface between psychology and politics.

[17]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 generally, see Hermann (1976); see also Holsti (1976) for a discussion of circumstances which maximize the impact of the decision-maker's beliefs.

[18]On case study analysis and political science in general, see Eckstein (1976); among the various psychodynamic or depth-psychological case studies, see especially George and George (1964); an example of the popular operational code approach is Walker (1977); a country-specific example is the research of Chan and Kringen (1978).

[19]Details are provided in Hopple (1978); see also Rokeach (1973).

[20]See Hopple (1978: 12-21) for details on the research design and the annual state samples.

[21]These various indicators and indicator realms are discussed in detail below and in Hopple (1978: 35-40).

[22]Nine values were statistically significant in the diplomatic exchange equation; six were significant in the non-military conflict equation; three were significant in the force equation. However, the beta weights were generally very anemic in magnitude.

[23]We have never employed the unemployment indicator in an actual analysis; the data are politically sensitive and therefore suspect and there are a number of missing data cases.

[24]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 unambiguously between the static and dynamic poles of the continuum.

[25]The action-reaction model is discussed in detail below; see also Hopple et al. (1977b) and the sources cited there.

[26]See Hopple et al. (1978b) for details; the WEIS crisis case study data will be deposited at the DARPA/CTO Development and Demonstration Facility (DDF).

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

[28]This dimensionalization routine also involved a principal-component solution and varimax rotation; there were 56 states and 5 years of data (280 cases).

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

[30]See Fountain and Rossa (1977: 1-2) for details.

[31]See the sources cited in note 6.

[32]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.

[33]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.

[34]Relevant single cases studies are cited in Parker (1977a: 226); see the comparative case studies in Hermann (1972); on framework-construction and application, see Brecher (1977) and Paige (1968).

[35]Content analysis as a research orientation has been applied to the 1914 and Cuban missile crises (see, e.g., Holsti 1972b, and Holsti et al., 1968; see also Holsti, 1972a); on simulation, see Havron and Blanton (1977) and Robinson et al. (1969); events data analysis is the subject of Burgess and Lawton (1972) and McClelland (1972); Lentner (1972) provides a rare example of the use of interviews in crisis research.

[36]On indicators and the computer base, see the sources cited above in note 1. General forecasting and crisis forecasting research are summarized in Parker (1977a: 231-238).

[37]See Parker (1977: 226-227); also pertinent are Hermann (1969) and McClelland (1961); for specific recent developments in the conceptualization arena, see Brecher (1977: 42-44), CACI (1975: 11-19), and McClelland (1977).

[38]See the sources cited above in note 8; see also Rosenau (1966) and Rosenau and Ramsey (1975).

[39]See the following representative studies: Hazlewood (1973, 1975): Rummel (1963); Tanter (1966); Wilkenfeld (1973).

[40]See, e.g., Burrowes and Spector (1973), Collins (1973), Liao (1976), Wilkenfeld (1975), and Wilkenfeld et al. (1972).

[41]See Scolnick (1974) and Stein (1976) for reviews and critiques of this literature.

[42]The "DDV" coding scheme represents an acronym for "danger, disaster, violence;" DDV coding is one technique which can be applied to dangers files data (McClelland et al., 1976: 14).

[43]See, e.g., Phillips (1973) and Wilkenfeld (1975). In a more basic sense, the stimulus-response analogy has been applied to interstate interaction in general -- in both pure and mediated models. On the latter, see Holsti et al. (1968). The reciprocity theory perspective has been emphasized in Phillips (1971), Phillips and Crain (1974), and Pruitt (1969). Triska and Finley (1965) stress that in order to remain in balance with an opponent, a state must react to a unilateral initiative on any dimension by responding on the same dimension

[44]The relative impact of the psychological realm was determined in a separate analysis, since the states in the decision-maker value samples constitute a subsample of the total sample of states. Multiple regression results for the psychological, societal, interstate, and global indicator domains are reported above (in the section on psychological indicators) and in Hopple (1978).

[45]See Appendix A in Rossa et al. (1978) for details.

[46]Appendix B in Rossa et al. (1978) discusses the control technique, which assumes interaction among the four state typological dimensions and allows mediated and unmediated effects of the manifest variables.

[47]The three equations were also estimated annually (N=56; five separate estimates). The results varied yearly; the reported parameters represent approximations to these fluctuating estimates. Subsequent analyses will employ varying time aggregations and lags.

[48]The ensuing discussion is speculative and may "stretch" our findings beyond their intrinsic limitations, given the preliminary nature of the analysis. We assume that the findings approximate real world processes and may be extrapolated to dyadic units of analysis.

[49]The apparent inability of our system to monitor non-military conflict behavior suggests that intrastate crisis indi cators may be most relevant here (see Rossa et al., 1978: 34-35

[50]An example of one such model is Choucri and North (1975); on causal modeling, see Asher (1976).

REFERENCES

ADELMAN, I., A. ABRAHAMSSON, B. ARESKOUG, L. O. LORENTSON, and J. WALLMYR (1975) "Applications of Methods I-II to Adelman-Morris's Data," in H. Wold (ed.) "Modelling in Complex Situations with Soft Information." Presented at the Third World Congress of Econometrics, Toronto, Canada, August.

ANDRIOLE, S. J. (1976) "Progress Report on the Development of an Integrated Crisis Warning System." McLean, Virginia: Decisions and Designs, Incorporated, Technical Report 76-19, December.

_____ and R. A. YOUNG (1977) "Toward the Development of an Integrated Crisis Warning System." International Studies Quarterly 21 (March): 107-150.

ANDRIOLE, S. J., J. WILKENFELD, and G. W. HOPPLE (1975a) "A Framework for the Comparative Analysis of Foreign Policy Behavior." International Studies Quarterly 19 (June): 160-198.

_____ (1975b) "The Sources and Processes of Foreign Policy Behavior: A Panoramic Conceptualization." Presented at the Annual Meeting of the International Studies Association, Washington, D. C., February.

ASHER, H. B. (1976) Causal Modeling. Beverly Hills, Ca.: Sage.

BANKS, A. S. (1972) "Patterns of Domestic Conflict: 1919-1939 and 1946-1966." Journal of Conflict Resolution 16 (March): 41-50.

_____ (1971) Cross-Polity Time-Series Data. Cambridge, Mass.: MIT Press.

BELL, B. D. (1978) "Early Warning and Monitoring System Software." McLean, Va.: Decisions and Designs, Incorporated, Early Warning and Monitoring Project Reseach Memorandum #21, February.

BERGSTEN, C. F. and L. B. KRAUSE [eds.](1975) World Politics and International Economics. Washington, D.C.: Brookings.

BLOOMFIELD, L. P. and R. R. BEATTIE (1971) "Computers and Foreign Policy -- The CASCON Experiment." Journal of Conflict Resolution 15 (March): 43-46.

BOBROW, D. B. and J. SCHWARTZ [eds.](1969) Computers and the Policy-Making Community. New York: Praeger.

BRECHER, M. (1977) "Toward a Theory of International Crisis Behavior: A Preliminary Report." International Studies Quarterly 21 (March): 39-74.

BURGESS, P. M. and R. W. LAWTON (1972) Indicators of International Behavior: An Assessment of Events Data Research. Beverly Hills, Ca.: Sage.

BURROWES, R. and B. SPECTOR (1973) "The Strength and Direction of Relationships Between Domestic and External Conflict and Cooperation: Syria, 1961-67," pp. 294-321 in J. Wilkenfeld (ed.) Conflict Behavior and Linkage Politics New York: David McKay.

BUTTERWORTH, R. L. (1976) Managing Interstate Conflict, 1945-1974: Data with Synopses. Pittsburgh, Pa.: University of Pittsburgh, University Center for International Studies.

CACI (1977) "Executive Aids for Crisis Management." Arlington, Va.: CACI, Incorported, Technical Report, April.

CACI (1975) "Crisis Inventory." Arlington, Va.: CACI, Incorporated, Final Technical Report, August.

CANDELA, C. (1974) "Decisionmaking During Crisis: A Literature Review." The Bendix Corporation, Final Report, August.

CHAN, S. and J. A. KRINGEN (1978) "The Elusive Black Box: Studying Decision Cultures at a Distance." Presented at the Annual Meeting of the International Studies Association, Washington, D. C., February.

CHOUCRI, N. and R. NORTH (1975) Nations in Conflict: National Growth and International Violence. San Francisco: W. H. Freeman.

COLLINS, J. N. (1973) "Foreign Conflict Behavior and Domestic Disorder in Africa," pp. 251-293 in J. Wilkenfeld (ed.) Conflict Behavior and Linakge Politics. New York: David McKay.

DAHL, R. A. (1961) Who Governs? Democracy and Power in an American City. New Haven: Yale University Press.

DALY, J. A. (1978) "Problems of Applied Monitoring and Warning." Decisions and Designs, Incorporated, Early Warning and Monitoring Project Research Memorandum #22, February.

_____ (1977a) "A Preliminary Comparison of Political and Military Indicators." McLean, Va.: Decisions and Designs, Incorporated, Early Warning and Monitoring Project Research Memorandum #15, September.

_____ (1977b) "Regional Tension: A Middle East Case Study." McLean, Va.: Decisions and Designs, Incorporated, Early Warning and Monitoring Project Research Memorandum #18, November.

_____ and B. D. BELL (1977a) "Probability Tables." McLean, Va.: Decisions and Designs, Incorporated, Early Warning and Monitoring Project Research Memorandum #14, August.

_____ (1977b) "Weighting Tension for Improved Warning and Monitoring Performance." McLean, Va.: Decisions and Designs, Incorporated, Early Warning and Monitoring Project Research Memorandum #16, September.

DALY, J. A. and G. W. HOPPLE (1977) "Increasing the Sample for the Cross-National Crisis Indicators Project." McLean, Va. and College Park, Md.: Decisions and Designs, Incorporated and Cross-National Crisis Indicators Project Joint Research Memorandum #1, October.

DALY, J. A. and J. F. WITTMEYER, III (1977) "ROZ: Preliminary Tests and Analyses." McLean, Va.: Decisions and Designs, Incorporated, Early Warning and Monitoring Project Research Memorandum #12, July.

DECISIONS AND DESIGNS, INC. (1977) The Development of a Crisis Early Warning Prototype System. McLean, Va.: Decisions and Designs, Incorporated, Technical Report, June.

_____ (1976) Remote Demonstration Computer System for Crisis Forecasting and Decision Analysis. McLean, Va.: Decisions and Designs, Incorporated, Technical Report, April.

ECKSTEIN, H. (1975) "Case Study and Theory in Political Science," ch. 3 in F. I. Greenstein and N. W. Polsby (eds.) Handbook of Political Science, Vol. 7. Reading, Ma.: Addison-Wesley.

_____ (1965) "On the Etiology of Internal Wars." History and Theory 4: 133-162.

FEIERABEND, I. K. and R. L. FEIERABEND (1966) "Aggressive Behaviors Within Polities, 1948-1962: A Cross-National Study." Journal of Conflict Resolution 10 (September): 249-271.

_____ and T. R. GURR [eds.](1972) Anger, Violence, and Politics: Theory and Research. Englewood Cliffs, N.J.: Prentice-Hall.

FOUNTAIN, L. and P. J. ROSSA (1977) "The Global Component: From the Conceptual to the Operational Realms." College Park, Md.: Interstate Behavior Analysis Project Research Report #32, September.

GALTUNG, J. (1964) "A Structural Theory of Aggression." Journal of Peace Research, II: 95-119.

GEORGE, A. L. and J. L. GEORGE (1964) Woodrow Wilson and Colonel House: A Personality Study. New York: Dover.

GEORGE, A., D. K. HALL, and W. R. SIMONS (1971) The Limits of Coercive Diplomacy. Boston: Little, Brown.

GREENSTEIN, F. I. (1975) Personality and Politics, rev. ed. Chicago: Markham.

GURR, T. R. (1970) Why Men Rebel. Princeton, N.J.: Princeton University Press.

_____ (1968a) "A Causal Model of Civil Strife: A Comparative Analysis Using New Indices." American Political Science Review, 62 (December): 1104-1124.

_____ (1968b) "Psychological Factors in Civil Violence." World Politics 20 (January): 245-278.

_____, with Charles Ruttenberg (1967) "The Conditions of Civil Violence: First Tests of a Causal Model." Princeton, N.J.: Princeton University, Center for International Studies Research Monograph #28, April.

HAVRON, M. D. and R. L. BLANTON (1977) "Simulation for Crisis Management." McLean, Va.: Human Sciences Reseach, Incorporated, Final Report, January.

HAZLEWOOD, L. A. (1975) "Diversion Mechanisms and Encapsulation Processes: The Domestic Conflict - Foreign Conflict Hypothesis Reconsidered," pp. 213-244 in P. J. McGowan (ed.) Sage International Yearbook of Foreign Policy Studies, Vol. III. Beverly Hills, Ca.: Sage.

_____ (1973) "Externalizing Systemic Stress: International Conflict as Adaptive Behavior," pp. 148-190 in J. Wilkenfeld (ed.) Conflict Behavior and Linkage Politics. New York: David McKay.

_____, J. J. HAYES, and J. R. BROWNELL, Jr. (1977) "Planning for Problems in Crisis Management: An Analysis of Post-1945 Behavior in the U.S. Department of Defense." International Studies Quarterly 21 (March): 75-106.

HERMANN, C. A. [ed.](1975) "Research Tasks for International Crisis Avoidance and Management." Columbus, Ohio: Mershon Center, The Ohio State University, Final Report, October.

_____[ed.](1972) International Crises: Insights from Behavioral Research. New York: Free Press.

_____ (1969) "International Crisis as a Situational Variable," pp. 409-421 in J. N. Rosenau (ed.) International Politics and Foreign Policy: A Reader in Research and Theory, rev. ed. New York: Free Press.

HERMANN, M. G. [ed.](1977) A Psychological Examination of Political Leaders. New York: Free Press.

_____ (1976) "When Leader Personality Will Affect Foreign Policy: Some Propositions," pp. 326-333 in J. N. Rosenau (ed.) In Search of Global Patterns. New York: Free Press.

HIBBS, D. A., Jr. (1973) Mass Political Violence. New York: John Wiley.

HOLSTI, O. R. (1976) "Foreign Policy Formation Viewed Cognitively," ch. 2 in R. Axelrod (ed.) Structure of Decision. Princeton, N.J.: Princeton University Press.

_____ (1972a) Crisis, Escalation and War. Montreal: McGill-Queen's University Press.

_____ (1972b) "Time, Alternatives, and Communications: The 1914 and Cuban Missile Crises," pp. 58-80 in C. F. Hermann (ed.) International Crises: Insights from Behavvioral Research. New York: Free Press.

_____, R. C. NORTH, and R. A. BRODY (1968) "Perception and Action in the 1914 Crisis," in J. D. Singer (ed.) Quantitative International Politics: Insights and Evidence. New York: Free Press.

HOPPLE, G. W. (1978) "Psychological Sources of Foreign Policy Behavior: Decision-Maker Values and State Outputs." Presented at the International Studies Association Annual Meeting, Washington, D.C., February.

_____ (1977) "Psychological Determinants of Foreign Policy Behavior: A Cross-National Data Set." College Park, Md.: Interstate Behavior Analysis Project Data Package #5, August.

_____, P. J. ROSSA, and J. WILKENFELD (1978a) "International Crisis Analysis: An Assessment of Theory and Research." College Park, Md.: Cross-National Crisis Indicators Project Research Report #5. To be presented at the Annual Meeting of the Midwest Political Science Association, Chicago, Illinois, April.

HOPPLE, G. W., P. J. ROSSA, and L. FOUNTAIN (1978b) "Toward an Integrated System of Crisis Warning Indicators: Preliminary Evidence from Pearl Harbor, Korea, and Cuba." College Park, Md.: Cross-National Crisis Indicators Project Research Report #4. Presented at the Annual Meeting of the Western Political Science Association, Los Angeles, California, March.

HOPPLE, G. W., P. J. ROSSA, and J. WILKENFELD (1977a) "Internal and External Inputs: Assessing the Relative Potency of Sources of Foreign Behavior." Presented at the Annual Meeting of the Midwest Political Science Association, Chicago, April.

HOPPLE, G. W., J. WILKENFELD, P. J. ROSSA, and R. N. McCAULEY (1977b) "Societal and Interstate Determinants of Foreign Conflict." Jerusalem Journal of International Relations 2 (Summer): 30-66.

HOPPLE, G. W., J. WILKENFELD, and P. J. ROSSA (1977c) "Societal Determinants of Foreign Policy Behavior." College Park, Md.: Interstate Behavior Analysis Project Data Package #2.

JENCKS, C. (1973) Inequality: A Reassessment of the Effect of Family and Schooling in America. New York: Harper and Row.

KEGLEY, C. W., Jr., G. A. RAYMOND, R. M. ROOD, and R. A. SKINNER [eds.](1975) International Events and the Comparative Analysis of Foreign Policy. Columbia, S.C.: University of South Carolina Press.

LENTNER, H. H. (1972) "The Concept of Crisis as Viewed by the United States Department of State," pp. 112-135 in C. F. Hermann (ed.) International Crises: Insights from Behavioral Research. New York: Free Press.

LIAO, K. (1976) "Linkage Politics in China: Internal Mobilization and Articulated External Hostility in the Cultural Revolution, 1967-1969." World Politics 28 (July): 590-610.

LOWI, T. J. (1967) "Making Democracy Safe for the World: National Politics," pp. 295-331 in J. N. Rosenau (ed.) Domestic Sources of Foreign Policy. New York: Free Press.

MARTIN, W. R. (1977) "U. S. International Security Associations: 1968-1976." Dominguez Hills, Ca.: California State University, NIEW Project Final Technical Report, September.

_____ (1976) "International Military Commitment Study Final Report: A Subtask of the Threat Recognition and Analysis Project." In C. A. McClelland, P. J. McGowan, and W. R. Martin, "Threat, Conflict, and Commitment." Los Angeles, Ca.: University of Southern California, Threat Recognition and Analysis Project Final Technical Report, Septembe

MARVICK, D. (1977) "Elite Politics: Values and Institutions." American Behavioral Scientist 21 (September/October): 111-134.

McCAULEY, R. N. (1977) "Analysis of International Behavior: Specification, Significance, and Critique." College Park, Md.: Interstate Behavior Analysis Project Research Report #33, September.

_____ (1976) "Analytic Strategies in the Comparative Study of Interstate Behavior: Some Preliminary Thoughts." College Park, Md.: Interstate Behavior Analysis Project Research Report #19, December.

McCLELLAND, C. A. (1978) "D-Files for Monitoring and Forecasting Threats and Problems Abroad." Presented at the Annual Meeting of the International Studies Association, Washington, D.C., February.

_____ (1977) "The Anticipation of International Crises: Prospects for Theory and Research." International Studies Quarterly 21 (March): 15-38.

_____ (1976) "Warning in the International Event Flow: EFI and ROZ as Threat Indicators." Los Angeles, Ca.: University of Southern California, Threat Recognition and Analysis Project Technical Report, July.

_____ (1972) "The Beginning, Duration, and Abatement of International Crises: Comparisons in Two Conflict Arenas," pp. 83-108 in C. F. Hermann (ed.) International Crises: Insights from Behavioral Research. New York: Free Press.

_____ (1961) "The Acute International Crisis." World Politics 14 (January): 182-204.

_____ and R. A. YOUNG (1969) "World Event/Interaction Survey Handbook and Codebook." Los Angeles, Ca.: University of Southern California, WEIS Technical Report #1, January.

McCLELLAND, C. A., P. J. McGOWAN, and W. R. MARTIN (1976) "Threat, Conflict, and Commitment." Los Angeles, Ca.: University of Southern California, Threat Recognition and Analysis Project Final Technical Report, Septmber.

McCLELLAND, C. A., R. G. TOMLINSON, R. G. SHERWIN, G. A. HILL, H. L. CALHOUN, P. H. FENN, and J. D. MARTIN (1971) "The Management and Analysis of International Event Data: A Computerized System for Monitoring and Projecting Event Flows." Los Angeles, Ca.: University of Southern California, World Event/Interaction Survey Project Technical Report, September.

MORSE, E. L. (1972) "Crisis Diplomacy, Interdependence, and the Politics of International Economic Relations," pp. 123-150 in R. Tanter and R. H. Ullman (eds.) Theory and Policy in International Relations. Princeton, N.J.: Princeton University Press.

MULLER, E. N. (1977) "Mass Politics: Focus on Participation." American Behavioral Scientist 21 (September/October): 63-86.

NESVOLD, B. A. (1971) "Scalogram Analysis of Political Violence," pp. 167-186 in J. V. Gillespie and B. A. Nesvold (eds.) Macro-Quantitative Analysis. Beverly Hills, Ca.: Sage.

ORLANSKY, J. (1970) "The State of Research on Internal War." Arlington, Va.: Institute for Defense Analysis, Science and Technology Division, Research Paper P-565, August.

PAIGE, G. D. (1968) The Korean Decision: June 24-30, 1950. New York: Free Press.

PARKER, R. W. (1977a) "An Examination of Basic and Applied International Crisis Research." International Studies Quarterly 21 (March): 225-246.

_____ (1977b) "Using Economic Indicators for Crisis Monitoring and Forecasting." McLean, Va.: Decisions and Designs, Incorporated, Crisis Forecasting Project Research Memorandum #8, March.

PHILLIPS, W. R. (1973) "The Conflict Environment of Nations: A Study of Conflict Inputs to Nations in 1963," pp. 124-147 in J. Wilkenfeld (ed.) Conflict Behavior and Linkage Politics. New York: David McKay.

_____ (1971) "The Dynamics of Behavioral Action and Reaction in International Conflict." Peace Research Society Papers 17: 31-46.

_____ and R. C. CRAIN (1974) "Dynamic Foreign Policy Interactions," in P. J. McGowan (ed.) Sage International Yearbook of Foreign Policy Studies, Vol. II. Beverly Hills, Ca.: Sage.

PRUITT, D. (1969) "Stability and Sudden Change in Interpersonal and International Affairs," in J. N. Rosenau (ed.) International Politics and Foreign Policy: A Reader in Research and Theory, rev. ed. New York: Free Press.

RICHARDSON, L. F. (1960) Arms and Insecurity. Pittsburgh, Pa.: Boxwood Press.

ROBINSON, J. A. (1972) "Crisis: An Appraisal of Concepts and Theories," pp. 20-35 in C. F. Hermann (ed.) International Crises: Insights from Behavioral Research. New York: Free Press.

_____, C. F. HERMANN, and M. G. HERMANN (1969) "Search Under Crisis in Political Gaming and Simulation," pp. 80-94 in D. Pruitt and R. C. Snyder (eds.) Theory and Research on the Causes of War. Englewood Cliffs, N.J.: Prentice-Hall.

ROKEACH, M. (1973) The Nature of Human Values. New York: Free Press.

ROSENAU, J. N. (1966) "Pre-theories and Theories of Foreign Policy," pp. 27-92 in R. B. Farrell (ed.) Approaches to Comparative and International Politics. Evanston, Il.: Northwestern University Press.

_____ and G. RAMSEY (1975) "External vs. Internal Sources of Foreign Policy Behavior," pp. 245-262 in P. J. McGowan (ed.) Sage International Yearbook of Foreign Policy Studies, Vol. III. Beverly Hills, Ca.: Sage.

ROSSA, P. J. (1976) "A Q-Factor Analysis of the State Attribute Domain." College Park, Md.: Interstate Behavior Analysis Project Research Report #24, December.

_____ and L. FOUNTAIN (1977) "The Interstate Component: Data and Indices." College Park, Md.: Interstate Behavior Analysis Project Research Report #30, September.

ROSSA, P. J., G. W. HOPPLE, and J. WILKENFELD (1978) "Interstate and Intrastate Crises: The Nexus in Theory and Practice." College Park, Md.: Cross-National Crisis Indicators Project Research Report #3. Presented at the Annual Meeting of the International Studies Association, Washington, D.C., February.

RUMMEL, R. J. (1966) "Dimensions of Conflict Behavior Within Nations, 1946-1959." Journal of Conflict Resolution 10: 65-73.

_____ (1963) "Dimensions of Conflict Behavior Within and Between Nations." General Systems Yearbook 8: 1 - 50.

SCOLNICK, J. M. (1974) "An Appraisal of Studies of the Linkage Between Domestic and International Conflict." Comparative Political Studies 6 (January): 485-509.

SHAPIRO, H. B. and M. A. GILBERT (1975) "Crisis Management: Psychological and Sociological Factors in Decision Making. McLean, Va.: Human Sciences Research, Incorporated, Final Technical Report, March.

SLATER, R. O. (1978) "Indicators of Domestic Change: A Comparative Framework and Application." Presented at the Annual Meeting of the Western Political Science Association, Los Angeles, Ca., March.

_____ (1976) "Interim Report: Governmental Change Indicators." Bethesda, Md.: Mathematica, September.

STEIN, A. A. (1976) "Conflict and Cohesion: A Review of the Literature." Journal of Conflict Resolution 20 (March): 143-172.

TANTER, R. (1966) "Dimensions of Conflict Behavior Within and Between Nations, 1958-60." Journal of Conflict Resolution 10 (March): 41-64.

TRISKA, J. F. and D. D. FINLEY (1965) "Soviet-American Relations: A Multiple Symmetry Model." Journal of Conflict Resolution 9 (March): 37-53.

WALKER, S. G. (1977) "The Interface Between Beliefs and Behavior: Henry Kissinger's Operational Code and the Vietnam War." Journal of Conflict Resolution 21 (March): 129-168.

WILKENFELD, J. (1978) "The NIPALS Technique: An Interim Report." College Park, Md.: Cross-National Crisis Indicators Project Working Paper #1, January.

_____ (1975) "A Time-Series Perspective on Conflict in the Middle East," pp. 177-212 in P. J. McGowan (ed.) Sage International Yearbook of Foreign Policy Studies, Vol. III. Beverly Hills, Ca.: Sage.

_____ (1973) "Domestic and Foreign Conflict," pp. 107-123 in J. Wilkenfeld (ed.) Conflict Behavior and Linkage Politics. New York: David McKay.

_____ and G. W. HOPPLE (1977) "Cross-National Crisis Indicators." College Park, Md.: Research proposal submitted to and funded by the Cybernetics Technology Office of the Defense Advanced Research Projects Agency, June.

WILKENFELD, J. and R. N. McCAULEY (1976) "A Preliminary Factor Analytic Exploration of the State Attribute Domain." College Park, Md.: Interstate Behavior Analysis Project Research Report #17, June.

WILKENFELD, J., G. W. HOPPLE, S. J. ANDRIOLE, and R. N. McCAULEY (1978) "Profiling States for Foreign Policy Analysis." Comparative Political Studies (Spring).

WILKENFELD, J., G. W. HOPPLE, P. J. ROSSA, and R. N. McCAULEY (1977a) "Action-Reaction, Societal, and Economic Explanations: Testing a Partial Model of Interstate Behavior." Presented at the Annual Meeting of the International Studies Association, St. Louis, March.

WILKENFELD, J., G. W. HOPPLE, and P. J. ROSSA (1977b) "Structural Characteristics of States." College Park, Md.: Interstate Behavior Analysis Project Data Package #1.

WILKENFELD, J., V. L. LUSSIER, and D. TAHTINEN (1972) "Conflict Interactions in the Middle East, 1949-1967." Journal of Conflict Resolution 16 (June): 135-154.

WITTMEYER, J. F. (1976) "Software Design for an Interactive Crisis Early Warning Prototype System." McLean, Va.: Decisions and Designs, Incorporated, Technical Report 76-20, December.

WOLD, H. (1975) "Methods II: Path Models with Latent Variables as Proxies for Blocks of Manifest Variables," in H. Wold (ed.) "Modelling in Complex Situations with Soft Information." Presented at the Third World Congress of Econometrics, Toronto, Canada, August.

_____ (1974) "Causal Flows with Latent Variables: Partings of the Ways in Light of NIPALS Modelling." European Economic Review 5 (June): 67-86.

YOUNG, O. (1973) "Political Discontinuities in the International System," in R. A. Falk and S. H. Mendlowitz (eds.) Regional Politics and World Order. San Francisco: W. H. Freeman.

_____ (1968) The Politics of Force. Princeton, N.J.: Princeton University Press.

YOUNG, R. A. [ed.](1977) "International Crisis: Progress and Prospects for Applied Forecasting and Management." International Studies Quarterly 21 (March).

ZIMMERMAN, W. (1973) "Issue Area and Foreign-Policy Process: A Research Note in Search of a General Theory." American Political Science Review 67 (December): 1204-1212.

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1. CNCI Research Report #1: Paul J. Rossa, "The Cross-National Crisis Indicators Project: Perspectives and Prospects."

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5. CNCI/DDI Joint Research Memorandum #1: Judith Ayers Daly and Gerald W. Hopple, "Increasing the Sample for the Cross-National Crisis Indicators Project." (produced jointly by the CNCI Project and the Early Warning and Monitoring Project of Decisions and Designs, Incorporated).

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Crisis warning	Interstate indicator
Indicator	State classification scheme
Indicator system	Crisis warning model
Intrastate indicator	Action-reaction model

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Cross-National Crisis Indicators (CNCI) Project focuses on the crisis warning aspect of the Crisis Management Program of the Defense Advanced Research Project Agency's Cybernetics Technology Office. The tasks of the CNCI Project include the development of intrastate indicators of crises, the development of interstate indicators of crises, and the construction and testing of integrated crisis warning models. Other tasks

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include expansion of the basic state sample, the updating of the state classification scheme data set, and the illumination of the nexus between intrastate and interstate crises.

Existing indicators in the various internal and external realms are discussed. The goals of developing and testing integrated crisis warning models are delineated in the context of three specific tasks: the search for linkages between interstate and intrastate crises; the development of the action-reaction model; and the utilization of several major theoretical perspectives. Among the latter are the preconditions/precipitants, diffusion/contagion, and status inconsistency models.

The task of updating the various data sets to 1975 has been virtually completed. The data will be deposited at the CTO Development and Demonstration Facility (DDF). Further research will be conducted in order to complete the tripartite and interrelated tasks of indicator specification and operationalization, conceptualization, and model development and testing.