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DYNAMIC PATTERNS
OF
INTERNATIONAL CONFLICT

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ABSTRACT

The study to be reported upon here has three goals: first, to find the dimensions of variation among nations with respect to their dyadic conflict behavior over a continuous series of months and to compare these month-to-month dimensions with dimensions derived through employing an annual time frame; secondly, to ascertain the groups of nation dyads that exhibit similar patterns of conflict behavior over time; and thirdly, to discuss the profiles of dyadic conflict behavior for each of the groups delineated in the analysis.

Data have been collected on several measures of foreign conflict behavior over 267 dyads for 1963. These data were reorganized into 12 month periods, intercorrelated, and factor analyzed. The factors derived from this analysis were then compared with those derived from the 1963 study of Hall and Rummel (1968). Factor scores for each dyad were then calculated to determine the dyad's position along the foreign conflict dimensions. These scores were employed in the calculation of distances for grouping by direct factor analysis. Profile delineation was computed using the factor scores for each of the groups derived in the analysis.

Five conflict dimensions were delineated in this over time analysis. The factor patterns were found identical to the cross sectional patterns found in earlier work (Hall and Rummel, 1968). Seven groups of similarly behaving dyads were delineated. Groups corresponding to Cold War conflict, routine military activity, crisis behavior, and third world discontent with major powers were delineated in profile

analysis. Investigation of the stability of patterns for one month periods suggests that the structure appears stable. Control for random and systematic error failed to signify contamination of results by variance due to error.

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INTRODUCTION

The research reported on in this study is designed to produce systematic information about contemporary patterns of conflict behavior and adjudge the practicality of a specific technique for identifying these patterns over time. Although these aims place some restriction upon the use of common sense and intuition, as will be seen, considerable insight can be gained into international conflict.

The goals of this research includes the eventual development of a theory of conflict behavior to forecast the behavior of one nation against another. Such an aim requires that research be completed on data amenable to time series analysis. While there are a number of difficulties with the type of information currently available to the student of international relations, the major finding of this paper is that a technique is currently available for identifying basic parameters of conflict behavior along which nation dyads vary. This identification of patterns of variation for dyads leads to a number of substantially interesting findings. These findings can be summarized here:

1. There are five independent (uncorrelated) patterns of conflict behavior between nations. These are:
negative communications, official acts of violence, unofficial acts of violence, negative sanctions, and warning and defense acts. These patterns are independent of the time frame chosen to study conflict behavior. Thus, if one uses cross-sectional techniques which hold time constant and analyzes monthly, quarterly, or yearly slices, the same

patterns emerge. Even when time is not held constant, as in over time analysis, the same five patterns occur.

2. The average scores for unofficial acts of violence (such as rioting or demonstrations) in Figure 1 depict an increasing trend. These nations exhibiting unofficial acts of violence were primarily Latin American and the rioting and protests were aimed at the United States. This is suggestive of the possibility that there is a growing discontent on the part of developing nations over their economic differences with the developed nations. The international system can expect an increasing trend in unofficial acts of violence.
3. Only a very few dyads (the behavior of one nation aimed at another) exhibited relatively high, continued amounts of conflict. Of the 267 dyads exhibiting conflict in 1963, only 17 engaged in prolonged conflict activity. While international conflict is often discussed and greatly feared, it is not a general characteristic of international relations.
4. There were six identifiable groups of similarly behaving dyads. These groups were characterized as: a cold war group engaging primarily in negative communications, a military violence group, a group of crisis dyads and a group accounting for the unofficial acts of violence discussed above.

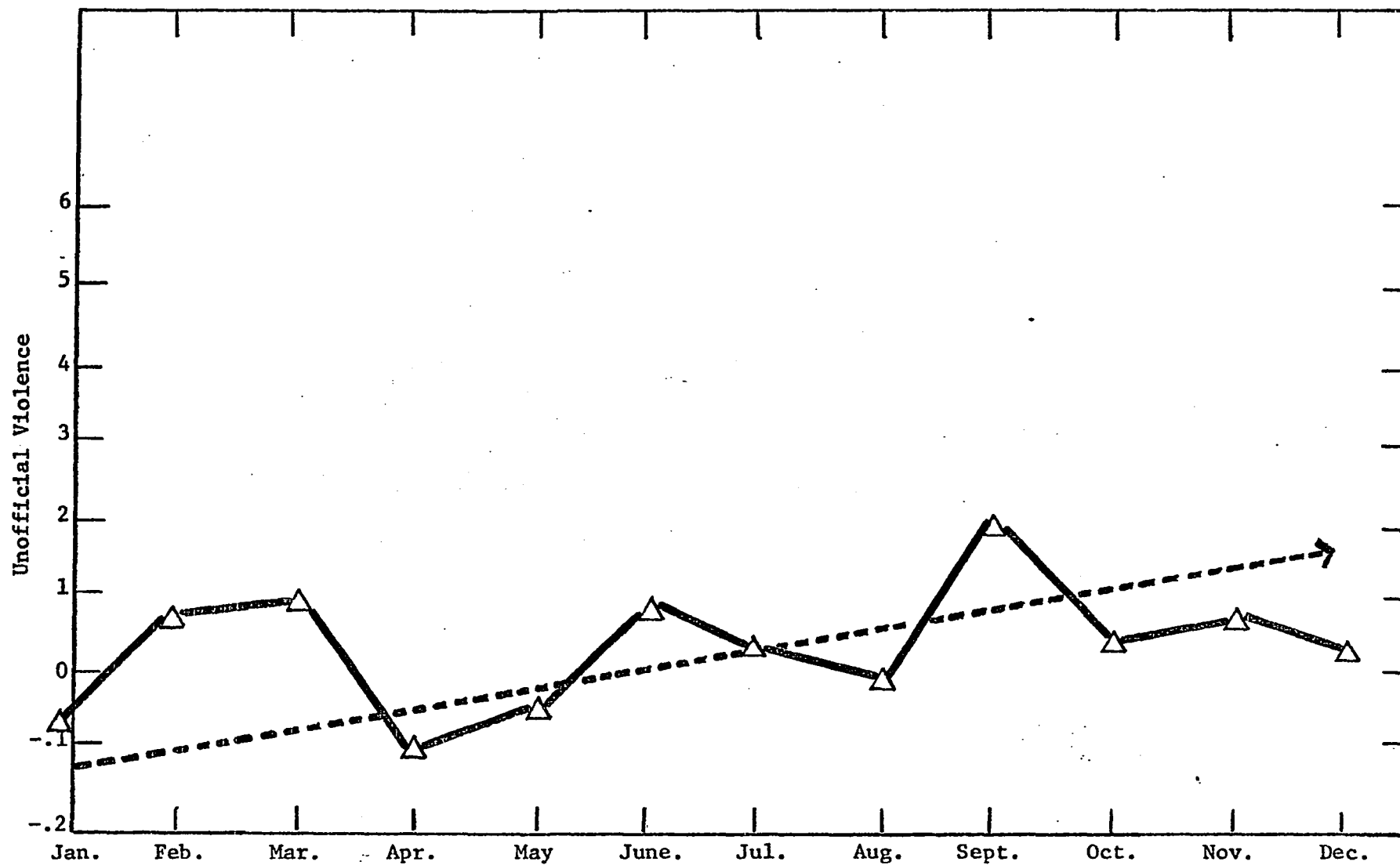


FIGURE I - AN INCREASING TREND IN UNOFFICIAL ACTS OF VIOLENCE

5. The Sino-Soviet conflict was found to be very similar to the Soviet Union's conflict with the United States. While the patterns of conflict between these three nations were quite similar, there were differences in the intensity of conflict scores. China's behavior toward the United States was quite similar in its intensity to its behavior towards the Soviet Union, but the Soviets exhibited considerably lower scores of conflict behavior towards the Chinese than towards the United States. In order to balance this relationship, it is suggested that the Soviets could be expected to increase the incidence of negative communication towards the Chinese. In 1963 it would appear that the Chinese had already declared the Soviets as an enemy with the same status as the United States. The Soviets had yet to act publicly and break with the Chinese.
6. A plot of the average scores of negative communication for the cold war group as in Figure 2 points out that the international system exhibits a consistent amount of diplomatic protests, accusations and other kinds of negative communications. The similarity in mean scores over the 12 months of 1963 suggests that future months will maintain the same level of hostile communication.
7. Figure 3 designates the mean scores of official

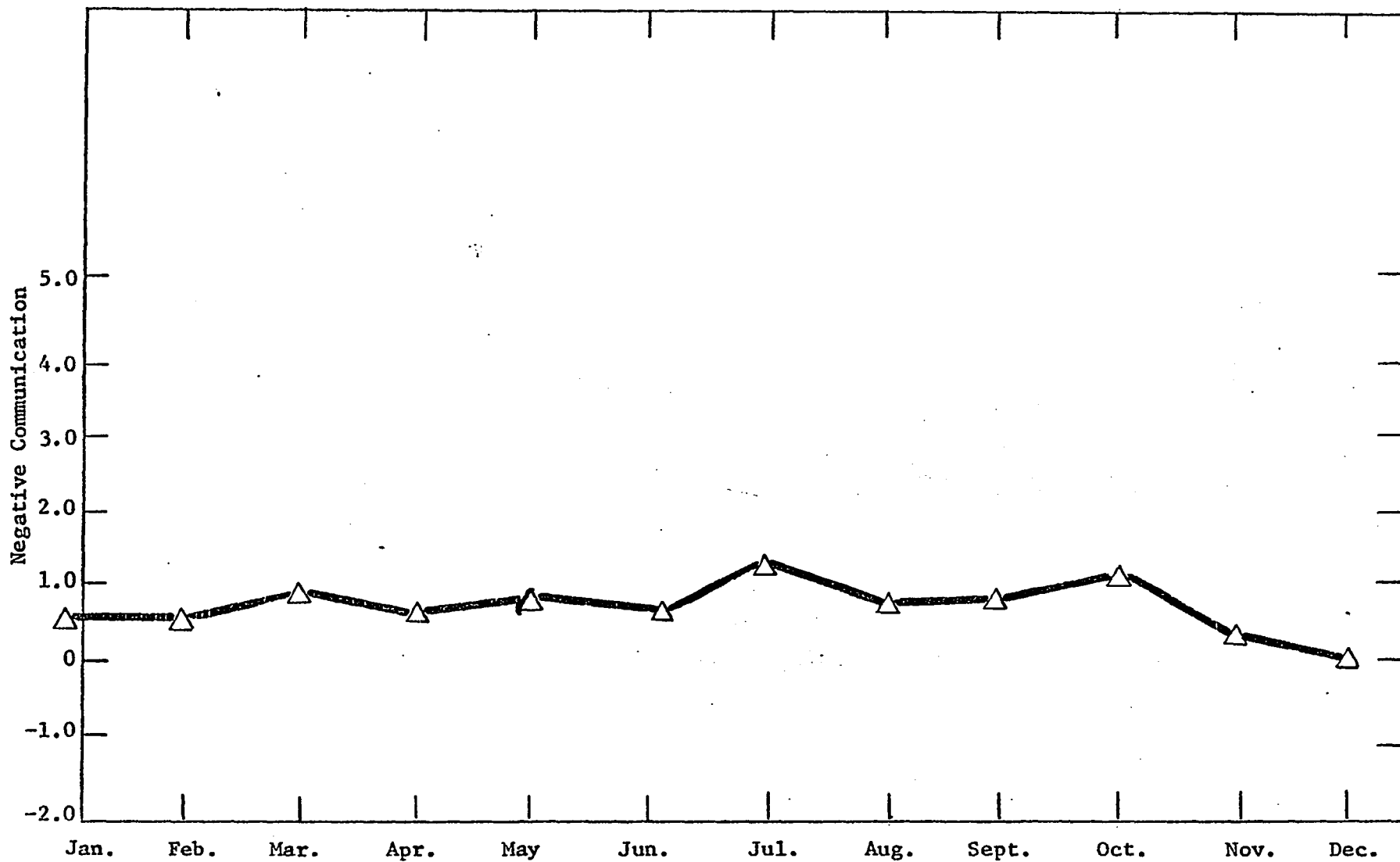


FIGURE II - A GROUP DISPLAYING A CONSISTENT AMOUNT OF NEGATIVE COMMUNICATIONS

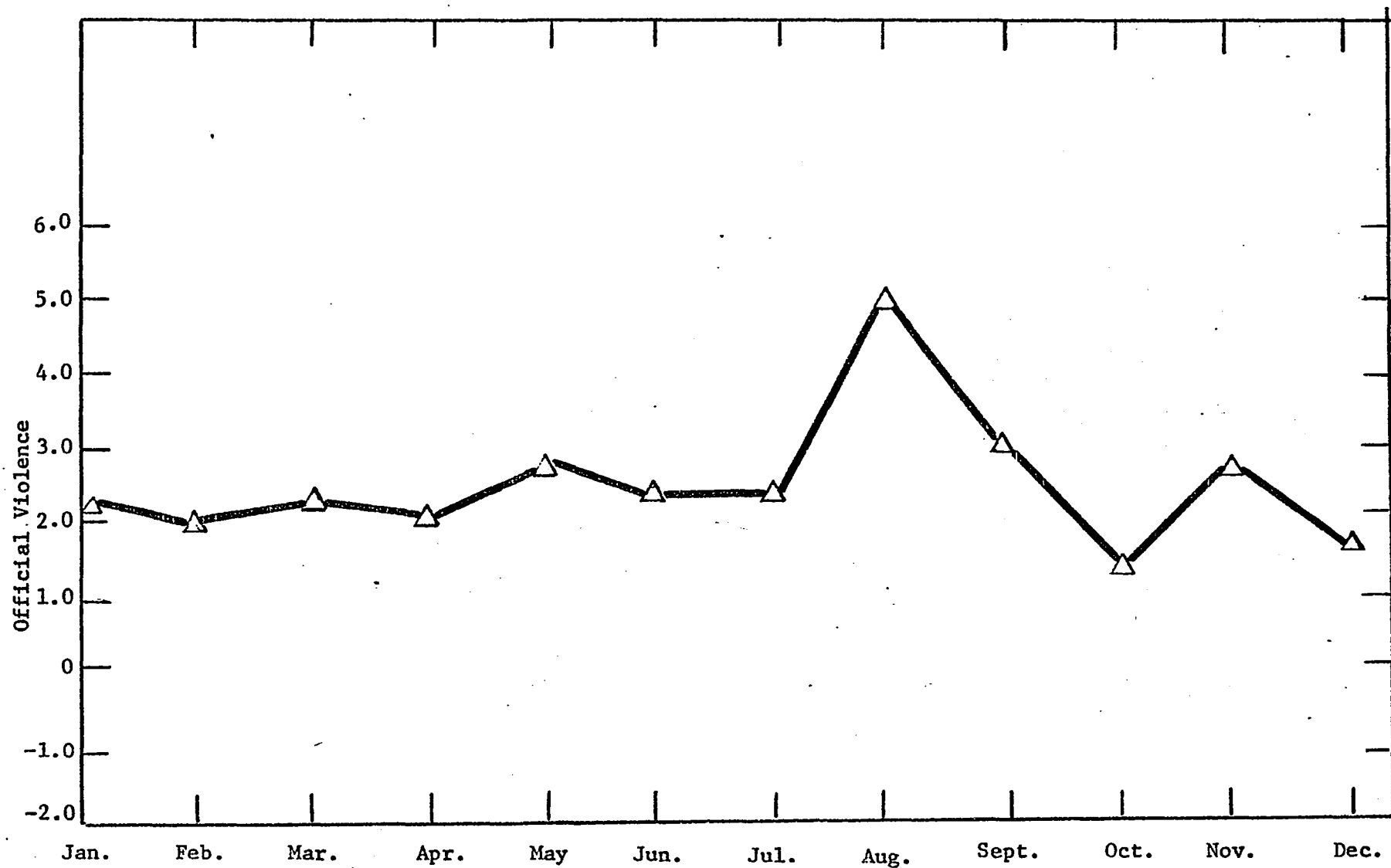


FIGURE III - A GROUP EXHIBITING ROUTINE CONFLICT BEHAVIOR

acts of violence for the military violence group.

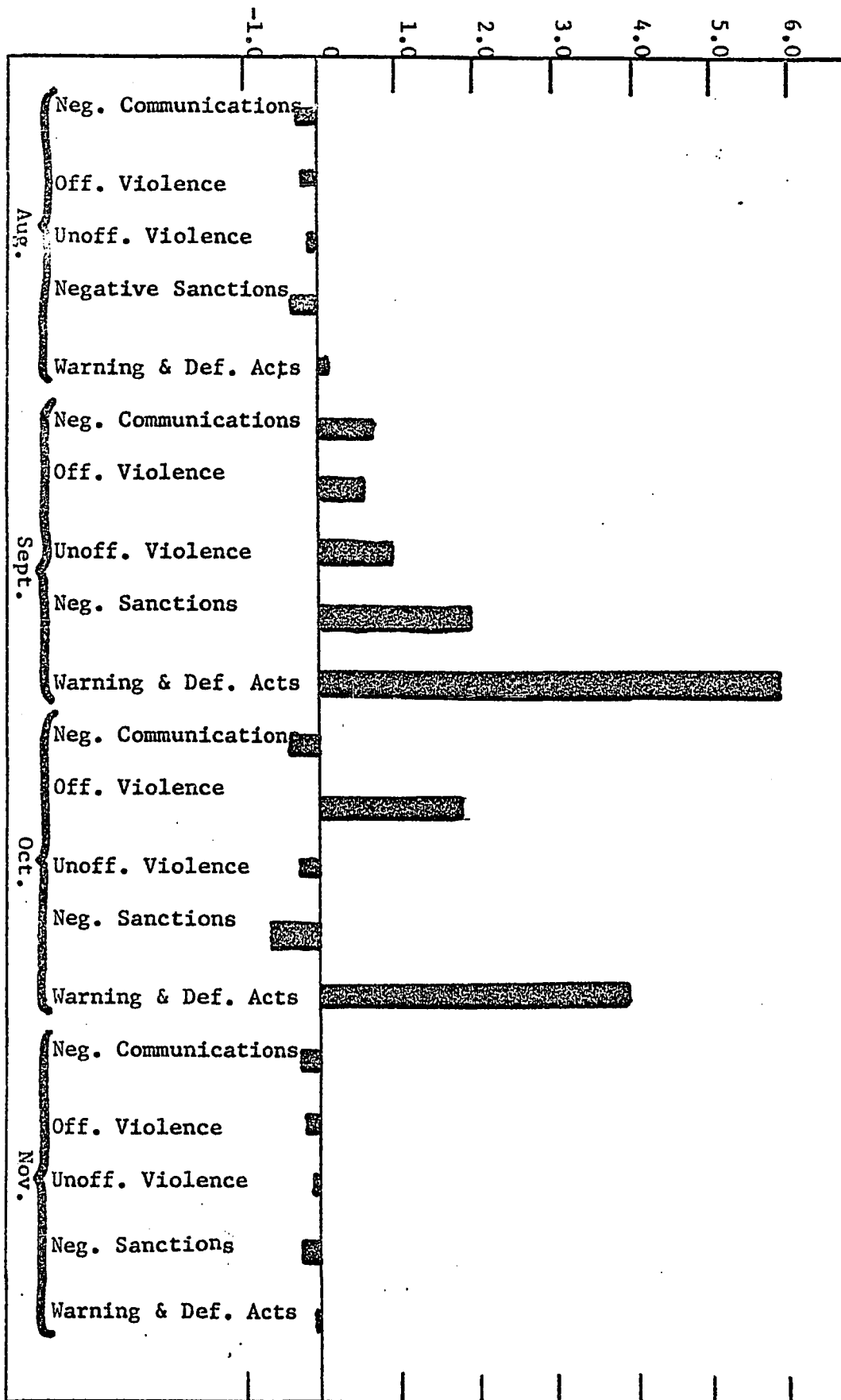
This pattern is interpreted to mean that there is a group of dyads which exhibit rather routine conflict behavior. Military violence is a part of the every day life of these nations. Each dyad exhibits its own specific pattern of military violence.

Occasionally, all the dyads in the group have violence at the same time as happened in August where the pattern score peaks in this figure. This suggests that, like every surfer knows, the ninth wave is usually the largest because it represents the co-occurrence of a series of small waves. It is possible that when these individual waves co-occur, the international system is placed under severe stress.

8. Figure 4 plots the mean monthly scores for the dyads exhibiting crisis behavior. Only four months are shown. The other months are all like the first and fourth months. Notice the sharp increase in conflict on most dimensions in the middle two months. This period coincides with the Malaysian-Indonesian crisis. Crisis behavior seems to be that period of time when dyads engaged in all forms of conflict.

These findings are some of the more important of those discussed in Chapters V and VI. Previous chapters discuss and present the means that were employed to reach these findings. Then, Chapters V and VI

FIGURE IV - CRISIS BEHAVIOR



set down the specific procedures, the results of each step, and the conclusions from these results. The final chapter takes stock of the current development of theory for explaining the patterns found here.

CHAPTER I
THE STUDY OF INTERNATIONAL RELATIONS

It is now commonplace to say that the study of international relations has been undergoing a scientific revolution. This revolution seems to be a generally accepted fact.¹ If any work can signify the shift to more systematic, scientific inquiry, it is Quincy Wright's A Study of War (1942), which dwells upon trends, themes, systematic methodologies, and the contributions of the social sciences to international relations. The new emphasis upon analytic components is not divorced from the older schemes, however. Concepts central to the field before the revolution still title the chapters of texts.² The heavy analytical emphasis of current research in international relations has served to tie together older concepts into a theoretical and explanatory nexus. This process was initiated early by the now classical works of Carr (1945) and Morgenthau (1954).

¹See: a. J. David Singer, "The Relevance of the Behavioral Sciences to the Study of International Relations," Behavioral Science, VI (October 1961), 324-335;

b. Karl Deutsch, Nerves of Government (New York, 1963);

c. Charles McClelland, "The Function of Theory in International Relations," Journal of Conflict Resolution, IV (September 1960), 303-336;

d. John G. Kemeny, "A Philosopher Looks at Political Science," Journal of Conflict Resolution, IV (September 1960), 292-301.

The relevance of the scientific inquiry is still debated, however. The most relevant explosions seem to be the exchange between Bull (1966) and Kaplan (1966) in World Politics and the forthcoming Rosenau and Knorr reader, Contending Approaches to the Study of International Relations.

²See: a. K.J. Holsti, International Politics (New Jersey, 1967).

b. C.A. McClelland, Theory and the International System (New York, 1966).

c. Harold Sprout and Margret Sprout, Foundations of International Politics, Van Nostrand (New York, 1962).

Eighteen years ago, Harold Guetzkow set forth a design for international relations research and theory that pointed in a constructive direction (1950). Guetzkow's idea is simply that the field was so extensive and complex that the best procedure would be to build some clusters or islands of partial theory and research. These clusters were to be connected gradually as relationships among the parts became clarified. The literature on self-examination and evaluation has grown in the eighteen years since Guetzkow wrote his challenge to the field;³ so too have the quantitative studies in international relations.⁴

In another important early work on theory, Charles McClelland (1960) has suggested that we consider the difference between the body of literature on what constitutes a Theory or model and the "theories" of international relations. Looking at Theory, there are two systems with which every scientist deals. First there is the analytical system composed of absolute truths. This system represents an organization

³ For a useful evaluation of the state of the art see: Raymond Platig, International Relations Research (Santa Barbara, 1967).

⁴ Singer comments, "....very little of the scientific work in international politics is published yet. That which is available to the entire scholarly community is often in journals that have not yet found their way to the traditionalist's desk. In a quick survey, I found that as of June 1967, there were still fewer than 100 English language articles which -- in my judgment -- fall in the scientific, data-based category, and of these, four were in World Politics and five in American Political Science Review, while the rest were in Journal of Conflict Resolution, Journal of Peace Research, Peace Research Society Papers, and General Systems. Moreover, with the time lag between submission and publication of an article, we rely increasingly on the exchange of pre-prints and other informal communications...." J. David Singer, "The Incomplete Theorist: Insight Without Evidence," to appear in Knorr & Rosenau (eds) Contending Approaches to the Study of International Relations, forthcoming.

of axioms relevant to the substantive interest of the analyst. In addition to this system, there is the empirical system about which our perceptions provide knowledge. The interface between the analytical and empirical system is the concern of science. At issue is the accuracy with which this connection is made. The method of science is not the mechanics of data analysis but the rationale on which it bases its acceptance or rejection of hypotheses.

There have been a number of alternative analytical systems employed in an attempt to comprehend the empirical system. The most widely employed method for organizing axioms is used in the logical analyses of the traditional approach. These attempts are quite compatible with the more current, mathematical approaches as has been demonstrated by Russell and Whitehead in Principia Mathematica (1910). There have been quite recent attempts to define an analytical system in this manner. The work of Galtung (1964) and Heintz (1968) are the logical organization of a series of hypotheses stemming from concepts of rank disequilibrium.

Proponents of logical approaches in international relations include Rosecrance (1963), Burton (1965), Liska (1957), Modelski (1962), Haas (1964), and Deutsch (1963). These writers' elaboration of an analytic conceptual scheme is an acknowledged move towards a science of international relations. But, analyses of this type only isolate important potential concepts. This is an extremely important part of investigation in any science and may leave its mark upon history without resort to mathematics or rigorous testing methods of any sort. If fruitful theory is to be developed, however, far more is necessary.

A logically consistent framework of concepts incorporating or explaining the empirically established relations is necessary. What is needed today is to move forward from these logical presentations: to pass beyond the identification of concepts into the identification of parameters and quantitative laws.

In the past decade alternative analytical systems have been used with increasing regularity. The newer techniques can be distinguished from the earlier, traditional approach in that they all have attempted to increase the rigor of their definitions to the point where verbal distinctions between cases or objects are replaced by quantitative distinctions. This development can be traced to two groups. Within political science departments, younger men were developing who had had mathematical or engineering backgrounds. Scholars like Brams, Alker, Denton, and Rummel are among this new group whose development coincided with the movement of more traditionally trained men into mathematical analysis (McClelland, Singer, Deutsch, Pool, and North). Research by Klineberg, Cantril, Richardson, Rappaport, Guetzkow, and Schelling--all examples of fertilization from other fields--began to be felt in international relations at the same time.

Perhaps, the most widely employed organization of empirical models in international relations has been statistical investigation. The statistical analysis of operationally defined concepts has taken two directions. The most frequently used approach has been descriptive. The work of McClelland, (1967), North, Holsti, and Brody, (1967), Singer and Small, (1966), and Tanter and Midlarski, (1967), fit into this group. These men have attempted to define concepts of substantive

interest by employing a single variable to represent each concept. Employing statistical techniques, they have then compared several of these concepts.

Some statistical analysts have been explicitly inferential in their approach. That is, they have stated an expected relationship and then tested to see if their concepts exhibited these relationships. Among the scholars working in this area have been Riker (1962), Zinnes (1967), Haas (1965), and Brody (1963).

Another attempt to develop an analytical system has been through the use of probability models. Probability models have been used by only a few scholars interested in international relations. Horovath has studied the probability distributions of wars and predicted their termination (1967, 1963). Weiss (1963), (1966), Narroll (1967), and Richardson (1960a) have also studied probability distributions of the occurrence of violent conflicts.

Alternative analytical systems have been developed from the mathematics associated with linear algebra. This branch of mathematics has had considerable impact on the study of international relations. Two related theoretical approaches to theory development, both relying upon linear algebra, have arisen. The newest of the two has been the graph theoretical attempts to describe structure by Brams (1968), McClelland (1968), and Harary (1961). The second and perhaps most widely employed of the linear algebra techniques has been factor analysis. The questions asked in this approach are of the form: To what extent is a set of vectors linearly dependent upon each other for a given range of values, and what are the minimum number of vectors

which can represent these values. This method of looking at reality considers a series of variables as vectors spanning the space which locates the entities being studied. It proceeds to delineate the scores for entities on the minimum set of dimensions needed to represent the original variable vectors. The technique is employed at least tacitly by Russett (1967), Alker (1964), Tanter (1966), Bwy (1968), Rummel (1965), Cattell (1949), Gregg and Banks (1965), and Denton and Phillips (1968).

A final form of model building has relied upon classical mathematics (Richardson, 1960b, Smoker, 1965, and McGuire, 1965). In classical mathematics one considers the variables as coordinates of the space being analyzed and then delineates the relationship between the variables by plotting a function. This method begins with knowledge of both the independent and dependent variables and seeks the functions and coefficients which relate the two sets of data. Classical mathematics is distinguishable from factor analysis in this respect as the latter assumes data on the dependent variable and proceeds to delineate a linear function. The object of factor analysis is to ascertain the linear function which best relates the dependent variables to a set of underlying, but unobserved independent variables.

To date, analytical models have been employed mostly in describing and organizing the empirical system. John R. Platt has pointed out that there is a developmental stage in which every science passes (1966). This stage includes an early period of emphasizing description and taxonomy building. The passage through this stage must be as quick as possible so that theory can become an integral part of the

field. Currently, there are few researchers in international relations who have an explicit theoretical model. Riker's coalition building model, Rummel's field theory, and Galtung's rank disequilibrium theory are among the few explicitly stated models.

Given the current descriptive stage of political science, a distinction should be made between mechanistic and abstractive theories of reality. The essence of a mechanistic theory is that one explains the mathematical relationships between his variables by introducing a series of substantively plausible intervening variables that have not been analyzed, but are expected to explain the relationships. Examples are: Deutsch and Singer (1964), Russett (1963), E. Haas (1967), and Singer and Small (1967).

Turning from mechanistic theory to abstractive theory formulations, these attempts accept the mathematical relationship as being interpreted without the addition of a series of mediating or intermediary variables. It is asserted that while there must be a series of agents acting between the variables analyzed, any attempts to delineate them would result in an infinite search of plausible intervening variables. Examples of work employing an abstractive point of view are: McClelland et al. (1965), Rummel (1965a), and Smoker (1964).

The advance of scientific theories in international relations certainly awaits the further development of model building. The unfolding of an analytical model is not divorced from the descriptive and taxonomic stages of development, however. While this study will be descriptive in nature, it is certainly not atheoretical. I will

take an abstractive approach to delineating relationships in my analysis.

My approach to the development of an analytic system will be through

factor analysis and linear algebra.

CHAPTER II

FOREIGN CONFLICT BEHAVIOR

The study of international conflict is not limited to any one discipline. Scholars of almost every disciplinary background have analyzed international conflict. A basic distinction is discernible within this group, however. Those who have approached international conflict from the psychological or sociological disciplines have assumed that conflict represents an abnormal type of behavior much like a mass mental sickness (Pear, 1950, Grace, 1952, Mead, 1964, Allport, 1964, Freud, 1964, and James, 1964). Political scientists and systems theorists have more often tended to look at conflict as representing normal interaction in the face of competing goals on the part of nations (Snyder and Paige, 1958, Organski, 1958, Wright, 1942, Boulding, 1962, McClelland, 1966, and Schelling, 1960).

This analysis will follow the latter attempts by defining conflict behavior as "opposition among social entities directed against one another..." (Wright, 1954, p. 146), and as "an adjustment process in which, as opposing energy systems meet, the energy of each is directed against the other to remove, dominate, or destroy it..." (Carr, *italics omitted*, 1942, p. 301).

Since "conflictual behaviors are those designed to destroy, injure, thwart, or otherwise control another party or other parties..." (Mack and Snyder, 1957, p. 218), these actions are considered to be dyadic; that is, they originate in one nation and are directed at another. Examples of such dyads are the United States to North Vietnam,

Soviet Union to China, Israel to Jordan, and Jordan to Israel.

The focus of my interest in conflict is on interaction--on the interplay of conduct--and, therefore, on social process much more than on observed or attributed traits of the actors. In the terminology now rising in the international relations field, McClelland (1966), Rosenau (1963), Singer (1961), Snyder (1954), and Sonderrmann (1961), the emphasis is on the workings of the international conflict system more than on the analyses of foreign policies. I wish to bring into focus a large number of the aspects, modes and functions of international political communications. Others have suggested approaches for analyzing this international conflict system. Boulding (1962), for example, has sketched a static model of competition within which he locates the concept of conflict. Parties to conflict are identified, the "positions" of parties in a behavior space are conceptualized, and conflict is defined "as a situation of competition in which the parties are aware of the incompatibility of potential future positions, and in which each party wishes to occupy a position which is incompatible with the wishes of the other" (p. 5). The result is the identification of the indifference area (or "set"), the conflict area, and the trading or bargaining area. Boulding's next step is to sketch in a dynamic model. This extension of his static model borrows heavily from Richardson processes and classical mathematics. The research proposed here will investigate a dynamic extension similar to Boulding's but employing linear algebra and factor analysis.

Boulding's thought provoking piece is especially applicable in the current period of international politics. The post World War II

period has produced a great deal of conflict. This behavior between nations has tended to cloud the clear distinction between peace and war. Throughout this period, several situations have exhibited quasi-peace alternating with quasi-war relationships; Indian-Pakistan and Arab-Israeli relations provide precise examples of this quasi-peace-war cycle. The Soviet Union and the United States have also experienced these fluctuations in certain places during certain time periods.

Current research efforts have concentrated quite heavily upon the topic of conflict behavior. Previous work has provided a good deal of information about conflict in the international system over time (Singer and Small, 1967, Denton and Phillips, 1968, Wright, 1942, Richardson, 1960a, Moyal, 1949, and Rosecrance, 1963), between select pairs of nations over time (McClelland et al., 1965, McClelland, 1968, North et al., 1967, Whiting, 1960, and Smoker, 1967) or for all nations at a single point in time (Rummel, 1967, and Tanter, 1966). While the preceding analyses have only begun to scratch the surface, another area of concern seems quite compelling. In order to develop a theoretical model accounting for changes in conflict relations over time and to analyze the conflict behavior of all nations, I will attempt to combine the longitudinal approach of the case studies, (Smoker and McClelland) with the all inclusive approach of the cross sectional studies (Rummel and Tanter).

The research completed here is part of a growing attempt at developing a predictive capability in international relations. Once the patterns of conflict behavior have been delineated, trends in conflict behavior between nations can be investigated. My eventual aim is to predict changes in conflict behavior between antagonists.

In order to accomplish this, it is necessary to trace the past history of a nation's conflict behavior with others and to investigate the ability of these histories to forecast future conflict behavior between nations. While realization of an actual theory of conflict behavior enabling prediction of changes in the conflict pattern of specific dyads is beyond the scope of this dissertation, the identification of a set of patterns for conflict behavior over the twelve months of 1963 has been accomplished. Information gained in this exercise should be beneficial in developing a predictive capability.

In adopting the approach employed here, I rejected the notion that international conflict can be measured by a single indicator such as the number killed. Such indicators represent only aspects of conflict, although important ones. I will be looking for the dimensions of conflict that are found to be independent of each other and searching for the smallest number of dimensions that accurately describe the variety of conflict behavior between nations over twelve monthly periods. Given the difficulty of using single variable indices for any one concept, i.e., poor data with unknown sources of error--random and systematic--and validity problems of the definitions, students of international relations are faced with the situation similar to Heisenberg's indeterminacy principle in quantum physics. They cannot measure the precise position or "charge" of a nation in the system. Instead, I have moved to methods that deal with probability densities--that define stable structure among arrays of behavior. In those areas where several variables tend to provide dense clusters of information I am most likely to find the best measures for describing international conflict.

In the preceding I have established the relationship of this study to previous analysis of conflict. I have also laid out the theoretical questions which guide the analysis, and which in summary are: (1) what are the dimensions of variation among nations with respect to their dyadic conflict behavior over a continuous series of months, (2) what is the relationship of these dimensions to the yearly dimensions found by Hall and Rummel: (3) what are the groups of nation dyads that exhibit similar conflict behavior over time; and (4) what are the profiles of each group's conflict behavior? What follows is a description of the data to be analyzed and the methodology that will be employed; after which I will present the results.

CHAPTER III

MEASURES OF CONFLICT BEHAVIOR

Conflict Behavior in 1963

Before discussing the measures of conflict behavior employed in this analysis, a discussion of the important conflict events of the year may be beneficial. This overall picture can enhance the understanding of specific trends later on in the analysis section.

1963 represents a relatively peaceful year in the sense that there wasn't very much military activity. The cold war between the United States and Soviet Union had reached a serious peak in late 1962 with the Soviet placement of missiles in Cuba. By January, 1963, however, this crisis was over and in February the Soviet Union agreed to withdraw troops from Cuba. The Kennedy government in the United States had been unable to reach an agreement with the Soviet Union over the status of Berlin. In connection with this there were disagreements over the United States' military access to West Berlin along the Autobahn in February and October which resulted in the stopping of several buses. These were the only diplomatic confrontations between the Soviet Union and the United States in 1963. There were two important agreements between these super powers, however. In June the Soviets and the United States agreed to install a "hot line" telephone system between the two capitols. The height of agreement occurred in August with the signing of the Nuclear Test Ban Treaty.

In Europe, French concern with her role in European affairs led to a refusal to allow the British entry into the Common Market in January and French withdrawal of troops from NATO in June.

Yugoslav-Albanian relations exhibited routine border clashes throughout the year. Conflict has become quite common along their borders.

Turning to Latin America, the pro-Communists civilian activity was concentrated in Venezuela with anti-American riots supported by the FALN occurring periodically. Relations between Haiti and the Dominican Republic reached a low in April and May when Haitian troops invaded the Dominican Republic embassy and the Dominican Republic countered by threatening an invasion if Haiti would not accede to its ultimatums. Latin American nations also joined with the United States in increasing activities aimed at preventing Cuban exportation of military arms to other Latin American rebels.

Asian conflict centered around the federation of Malaysia in September and the hostilities between Indonesia and Malaysia which commenced immediately after federation. In Vietnam, the Diem regime was overthrown in November. This change in government ended a series of disagreements between the United States and the South Vietnamese during October.

Chinese Communist-Soviet relations reached a low in October and September after Soviet denunciations broke up a July conference between these two nations. The Chinese expressed strenuous disagreement with the Soviet handling of the Cuban crisis and the Soviet's general attitude towards conflicts with the West. These disagreements were marked by the publication of letters denouncing each other, on several occasions.

The Kennedy assassination in November, while an internal event, may well have influenced international conflict behavior in the latter

part of 1963. Figure 5 lays out the important conflict behavior for the year. This overall charting of conflict will be referred to when specific conflict patterns are discussed later in the results.

Data

The conflict data have been collected from the daily New York Times using the foreign conflict code sheet given in Rummel (1966). The data were collected by actors, objects, date, and type of conflict act or action. Figure 6 presents the code sheet. The information contained in the code sheets for 1963 were reorganized into a set of 23 conflict variables. Table I presents the 23 variables used in this analysis. The variables represent combinations of coded information on the code sheet. The same 23 variables were used to analyze 1963 dyadic conflict behavior (Hall and Rummel, 1968).¹ Figure 7 presents the form of the matrix of data which was analyzed in that work. It should be clear that the results of factor analyzing this matrix will refer to patterns of conflict behavior of nations directed toward other nations. There were 267 dyads exhibiting conflict behavior in 1963. I will employ all 267 dyads in this study and make use of the data collected by Rummel. The data will be reorganized from the frequencies for the one year employed in the previous study to a month-by-month aggregation. The data matrix of Figure 7 will be one of twelve slices that will be used in the current project. Each slice

¹The original unorganized data is on file with the Inter-University Consortium for Political Research. Providing the data in the final form used here would have required 3,204 lines or about 60 pages. Since this was not feasible, interested users can obtain the data upon request from ICPR.

FIGURE V - THE IMPORTANT CONFLICT EVENTS OF 1963

Jan.	Britain refused entry into the Common Market.
Feb.	USSR agrees to withdraw troops from Cuba. Venezuelan bombing of United States property. Berlin bus incident.
Mar.	Venezuelan rioting
Apr.	Haiti invades Dominican Republic's embassy.
May	Dominican Republic threatens Haiti - crisis.
Jun.	USSR Hot Line agreement with USA. France withdraws troops from NATO. Chinese letter to USSR.
Jul.	Sino-Soviet meetings broken up.
Aug.	Test Ban Treaty signed. Syrian border clashes. Jordanian border clashes.
Sept.	Federation of Malaysia founded - crisis. Chinese letter denouncing Soviets. Venezuelan riots against USA.
Oct.	Berlin bus incident.
Nov.	Kennedy assassinated. Syrian border clash.
Dec.	

Unofficial Acts

22-23 Unplanned Violence = 10 22-23 Unclassified Violence = 11 22-23 Non-Violent Behavior = 12 22-23 Unclassified = 13 74 Comments or Qualifications on Any Official or Unofficial Acts Above = 0	Attack Methods → Unclassified = 1 Hand = 1 Fire = 1 Bombing = 1 Sniping = 1 Firearms = 1 Missiles, Rocks, Bottles, etc. = 1 Heavy Armament = 2
	Numbers → Involved: 43 44 45 46 47 48 or, if no exact data on involved → 49 = 0 (1-9) 49 = 1 (10-99) 49 = 2 (100-999) 49 = 3 (1,000-9,999) 49 = 4 (10,000-99,999) 49 = 5 (≥ 100,000) Arrests: 50 51 52 53 54 55 = 0 (involved data for actor) 55 = 1 (for both participants) 55 = 2 (for all participants)
	Casualties → Killed: 56 57 58 59 60 Wounded: 61 62 63 64 65 or, if no data on killed or wounded → 66 67 68 69 70 71 = 0 (1-9 Killed) 71 = 1 (10-99) 71 = 2 (100-999) 71 = 3 (1,000-9,999) 71 = 4 (≥ 10,000) 72 = 0 (casualty data for actor) 72 = 1 (for both participants) 72 = 2 (for all participants)
	Act → Unclassified = 0 Boycott = 1 Protest Rally = 2 Anti-foreign Demonstration = 3 Uncountable Anti-Foreign Demon. = 4 Numbers → Involved: 25 26 27 28 29 30 31 32 or, if no exact data on involved → 33 = 0 (1-9) 33 = 1 (10-99) 33 = 2 (100-999) 33 = 3 (1,000-9,999) 34 = 4 (10,000-99,999) 35 = 5 (≥ 100,000)
Description of Unclassified Act →	

FIGURE VI

TABLE I. DYADIC FOREIGN CONFLICT VARIABLE LIST WITH CODES*

Primary Category	Variable		Variable
	No.	Code	
warning and defensive acts	1	WARNDF	- Warning and Defensive Acts
	2	ALRTMB	- Alerts and Mobilizations
official acts of violence	3	PLNVIL	- Planned Violent Acts
	4	WARACT	- Overt Violence
	5	DISCMA	- Discrete Military Actions
	6	DAYVIL	- Days of Violence
negative sanctions	7	NEGACT	- Negative Behavior Acts
	8	UNCNEG	- Unclassified Negative Acts
	9	SEVDPR	- Severence of Diplomatic Relations
	10	EXPREC	- Expulsion or Recall
	11	BCOTEM	- Boycott or Embargo
	12	AIDREB	- Aid to Rebels
negative communication	13	NEGCOM	- Negative Communication
	14	WRTCOM	- Written Negative Communication
	15	ORLCOM	- Oral Negative Communication
	16	ACCUSN	- Accusations
	17	PROTST	- Protests
	18	MINTHM	- Minor Themes
unofficial violence	19	UNOFVL	- Unofficial Violence
	20	ATKEMB	- Attacks on Embassy
	21	ATKPER	- Attacks on Persons
	22	ATKFLG	- Attacks on Flag
non-violent demonstrations	23	NVIOLB	- Non-Violent Behavior

*Primary code sheet categories are separated by solid lines. Variables 1-19 are Official Acts; Variables 20-23 are Unofficial Acts.

<u>Directed Dyads</u>	<u>Behavior</u>				
	Clashes	Days of Violence	Negative Acts	Diplomatic rebuffs	Anti-foreign acts
Albania-Greece					
Albania-Italy					
Albania-USA					
Argentina-Brazil					
.					
.					
.					
Syria-Turkey					
Syria-U. Kingdom					
.					
.					
.					
Yugoslavia-U. Kingdom					
Yugoslavia-USA					
Peace dyad					

FIGURE VII - R-Matrix

records the conflict activity for the international system in a monthly time frame. The result of data organization will be a cube of M number of variables across 267 dyads, twelve months deep. Figure 8 presents the form of the cube to be analyzed.

Two questions are pertinent at this point:

- 1) Why have months been chosen as the time frame, and
- 2) Is the New York Times a sufficient source of information?

Time Frame

I am interested in the diplomatic aspects of conflict--the give and take of international bargaining and negotiation. I will want to concentrate on as small a time frame as my data will allow. I have chosen months rather than weeks or days for a time frame because there did not seem to be enough conflict events reported in the New York Times in a day or a week. Thus, the matrix that would result for each week would contain too many zero cells. It is possible, however, that when using monthly periods, the structure of conflict will be effected by the same lack of data. An alternative time frame would have been three-month periods. As a check on the consistency of conflict dimensions over time, I have reorganized the data into four separate three-month periods. If the factor structure of these quarterly periods remains consistent and is in agreement with the monthly factor structure, I will assume that monthly periods are acceptable.

Reliability

Turning to the reliability problem associated with the use of a single newspaper, I do not consider that the New York Times provides accurate frequency counts of the amount of conflict between any two

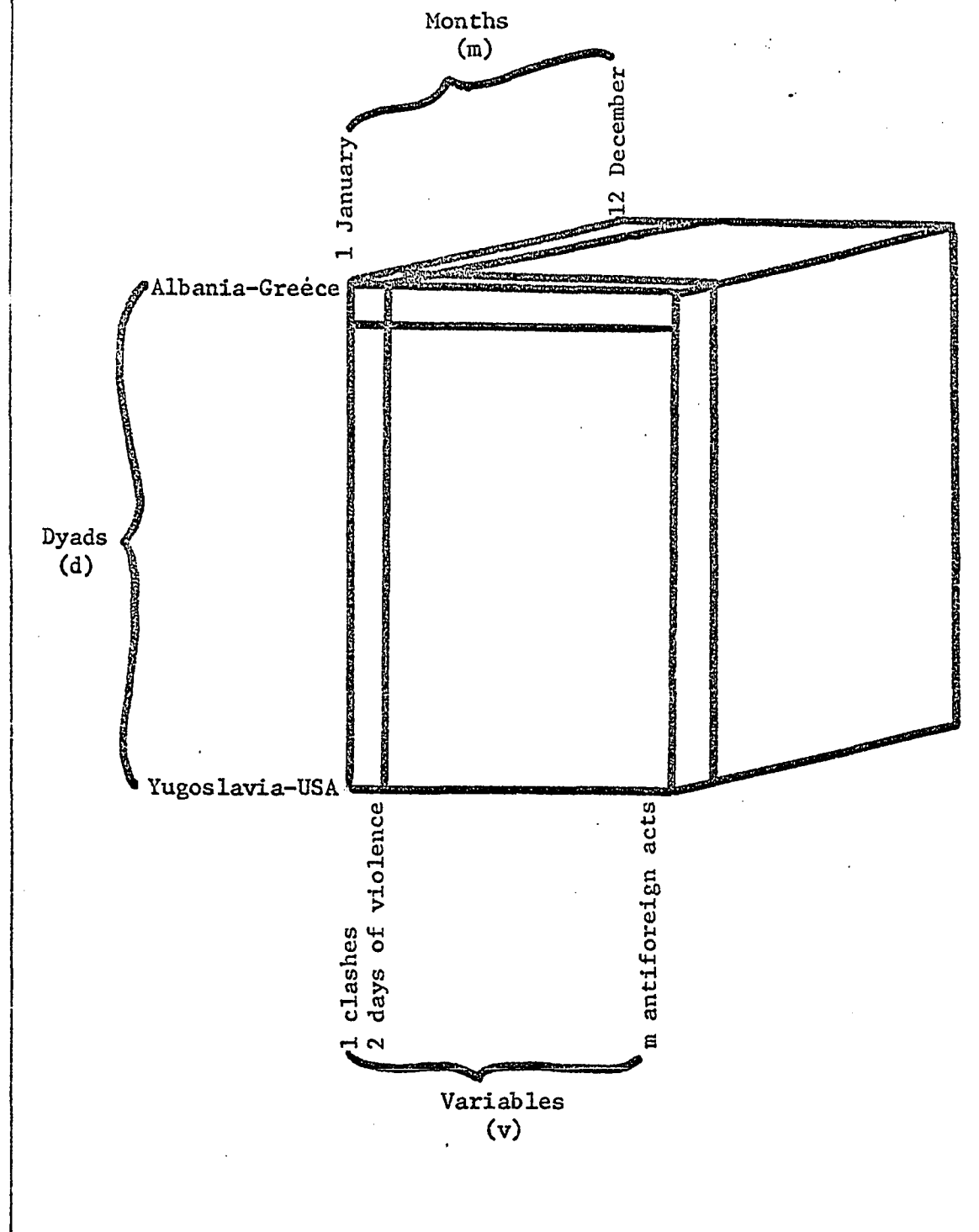


FIGURE VIII - DATA CUBE

nations. In fact I assume the frequency of conflict acts to be an understatement in most cases. Thus, the number of warnings and defense acts between Israel and Jordan may not reflect the actual quantities in a given month. I do consider the source as presenting an accurate pattern of occurrences for each variable over the dyads in this study, however. The correlation coefficient that will be the initial measure of similarity employed in this research, measures the pattern similarity of values for two conflict variables and not the magnitude similarity. Thus, if two variables measuring conflict behavior have the same pattern, they will be perfectly correlated. Figure 9 depicts this relationship.

The New York Times is a source of readily available data in international relations. Its use is gaining a good deal of investigation. Smith (1967) attempted to ascertain whether the New York Times was as good a source as other non-newspaper sources. He compared the New York Times with the Indian White Paper on the Sino-Indian border crisis and found that when one uses correlational procedures, the New York Times is an accurate representation of the patterning of conflict behavior. The availability of records from the foreign offices of various nations is not sufficient to make further tests of these assumptions feasible at this time. No doubt, more effort must be expanded in this task, however.

Some question has arisen as to the reliability of a single newspaper. Any newspaper, no matter how large it may be, is confronted with the problems of editorial decisions and national biases. It is argued that a data source using several newspapers would minimize

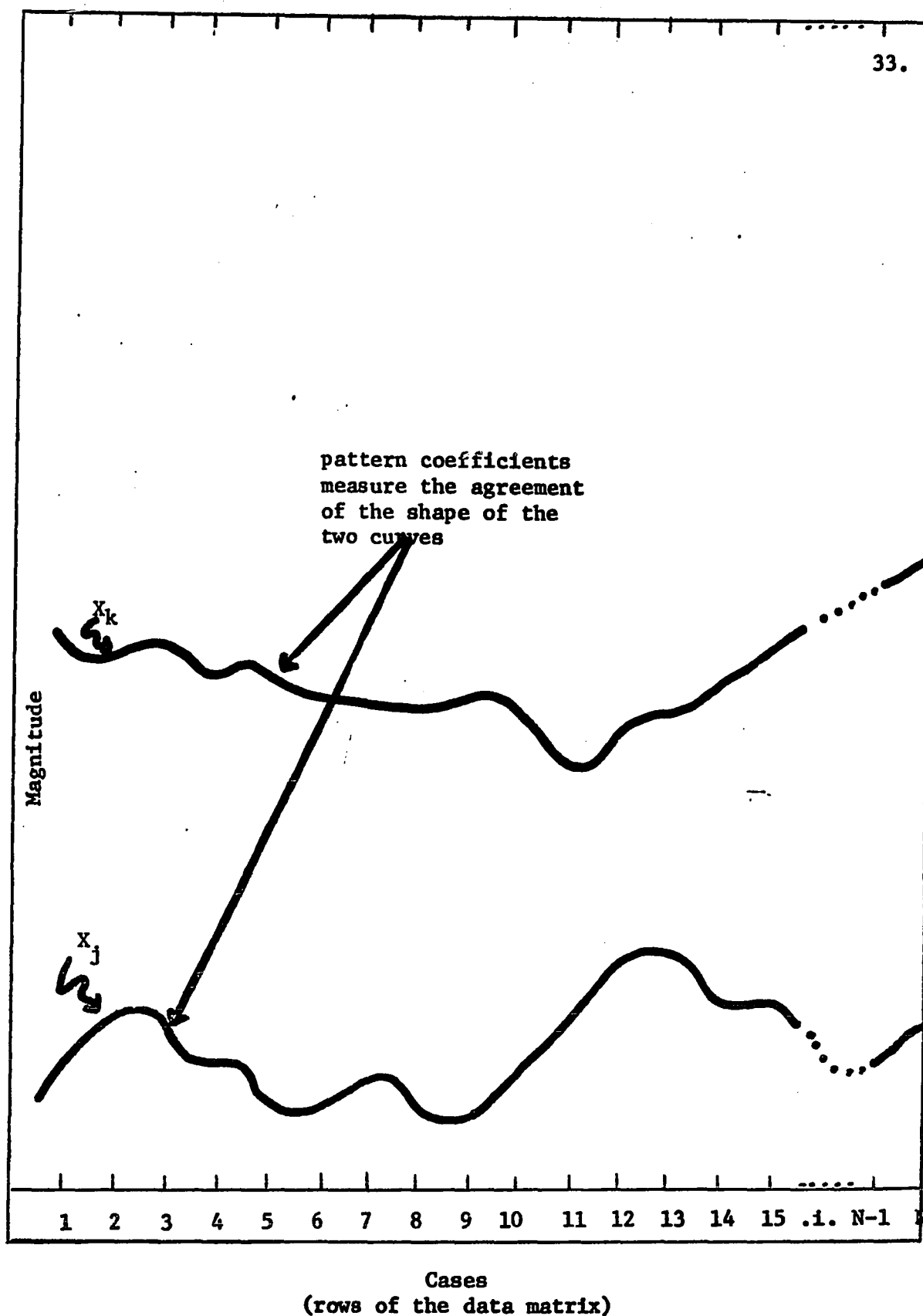


FIGURE IX - PATTERN COEFFICIENT

this bias. McClelland et al. (1965) employed newspapers from five different countries. In his study of the Taiwan Straits conflict he found the same pattern of conflict represented in the five newspapers studied as were found by Sullivan (1964 and Phillips (1964) in their same study employing only the New York Times Index. In another investigation, Gamson and Modigliani (1965) studied the reliability of the New York Times reporting of U.S.-Soviet behavior. They found in the comparison of nine different papers that while the New York Times correlated highly with the patterns of conflict reported, the quantity of reports were much higher in the New York Times than any other newspaper. The above information seems to lend support to the choice of the New York Times as a single source of data, at least at this stage of analysis.

Random Error

Error in conflict data can be of two types: random or systematic. If random error were present, the correlations between variables would be reduced below what they would be without such errors. That is, a significant correlation between data that one suspects to contain a lot of random "noise" can be considered even more significant than if one were dealing with uncontaminated data.² The impact of such error on the results of factor analysis would be to lower somewhat the loadings that the variables have on the factors, but not to distort the

²See: Mordecai Ezekiel and Karl A. Fox, Methods of Correlation and Regression Analysis, Third Edition, John Wiley & Sons, Chapter 18, "On the Effect of Random Error" (New York, 1966).

factor structure as a whole.³ I included a variable of random numbers, chosen from a random number table, in my analysis. The results of factor analyzing a matrix that includes this variable would provide two bench marks in interpreting the general results. If, for instance, the random variable has a loading of .25 on a factor, then all loadings less than or near that should be considered as questionable. The loadings might be the result of random error alone. By looking at the communality of the random variable across all factors, the researcher can estimate the potential effect of random error. The variance accounted for in factor analysis of variables with communalities similar to the random variable may be due to random variance alone.

Systematic Error

Systematic error is that correlated with either the error or true values of the other variables. The result may be overly high or low correlations and factors with little accuracy. Three separate variables will be included to check on systematic error. The average national income of both nations in the dyad will be used as a measure of the joint power for that dyad. The mean energy consumption per capita of a dyad will be included as a measure of the joint economic development of the dyads. And thirdly, a measure of censorship in A and B will be included to check on the likelihood of differences in the reporting of conflict behavior between dyads about which information

³ See Mosier's experimental findings on this point and Cattell's comments: Charles I. Mosier, "Influence of Chance Error on Simple Structure: An Empirical Investigation of the Effect of Chance Error and Estimated Communalities on Simple Structure in Factorial Analysis," Psychometrika, 4 (1939), 33-44. Raymond Cattell, Factor Analysis, Harper & Bros. (New York, 1952).

is difficult to acquire.⁴ Other studies have made similar attempts at ascertaining the effect of systematic error and have used the high loadings of the systematic error variables as bench marks when interpreting the factors (Rummel, 1964, and Tanter, 1966).

Time Sequence

In addition to variables measuring conflict behavior and various components of error, two time variables were employed to help in discussing the dimensions of dyadic conflict behavior. The first variable contained a 1 in all entries for January, a 2 in all entries for February and so on through a 12 for December observations. This variable is employed to check for monotonic increases or decreases in conflict behavior along a specific dimension. If the variable loads highly on a specific dimension, all other variables loading in the same direction can be interpreted as having increased over time in this analysis. The second variable formed a sine function which had a high score for summer months, a low score for winter months and an increasing or decreasing score for spring and fall, respectively. This specific sine function corresponds to the notion that conflict is dominated by the action of nations in the northern hemisphere and they have traditionally chosen to participate in conflict during the spring and summer rather than fall or winter. A check of variables which load with these time functions will provide descriptive information as to trends in conflict behavior.

⁴This data was taken from the Dimensionality of Nations Project files for 1963.

CHAPTER IV

THE RESEARCH DESIGN

The flow of a research project is along a path with many forks in it. At each fork in the road, a decision must be taken. A choice must be made which designates one of the many possible routes to reaching a final conclusion. The choices comprising a particular project are crucial in understanding the specific implications of each finding.

In this section the methods to be employed will be described in logical order as they were made in completing the research. Figure 10 represents a flow chart of the steps followed in this analysis. The specific details of each of the choices in this chart are discussed in the beginning of each chapter presenting the results. In this chapter a conceptual discussion of the major decisions will be presented.

Previous discussion has considered conflict as an interactive exchange between opposing nations. The desire of this research is the delineation for dyads of basic patterns of conflict behavior which remain constant over a number of points in time. The particular measures of conflict discussed in the chapter on data are considered significant only so far as they contribute to defining these patterns of dyadic conflict over time. The patterns, then, will be the variables which can be used in predictive studies at a future date.

The basic data cube from which this analysis begins was depicted in Figure 8. There are three basic sides or modes in this cube: the originally collected measures of conflict, the 267 dyads exhibiting conflict and the 12 months for which the data have been collected. Cattell terms this data cube a multi-faceted matrix (Cattell, 1956,

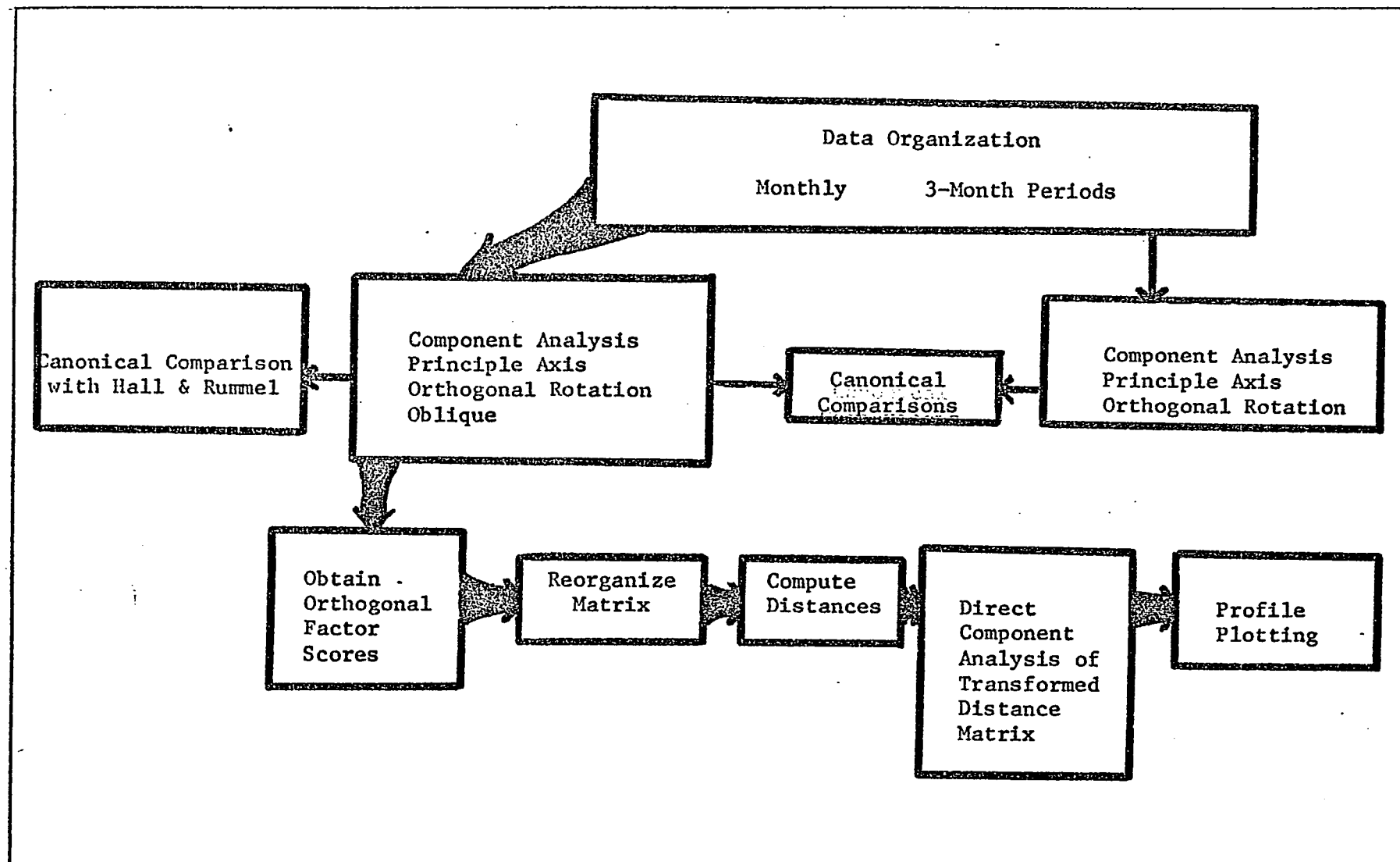


FIGURE X - RESEARCH FLOW CHART

p. 121). There are a number of ways that variation can take place in this matrix. For my purposes, the variation will be considered in conflict behavior between dyads over time. Thus, patterns which account for changes in dyadic conflict behavior from month to month will be delineated.

In order to appreciate the distinction between normal two-facet matrices and this three-facet analysis, let us review the outcome of a normal cross section analysis. The predominate two-faceted matrix of variables across dyads as displayed in Figure 7 is termed an R-analysis. It describes the variation in conflict measures across the dyads holding time constant. This form of analysis resembles taking a picture with the shutter on the camera held open for a long time. If the picture is in the down town area of a major city, buildings, street signs and other stationary objects would show clearly, but automobiles and pedestrians would have been moving too fast to be recorded on the negative or they would have shown up as solid blurs depending on the photographer's technique. Analysis of an R-matrix normally results in the clear identification of patterns of variation among dyads without respect to time. Holding time constant by aggregating all dyadic behavior for a year, will permit identification of variation in the total amount of behavior for that year, but it cannot be expected to account for time patterns of conflict behavior.

My interest, however, is in these time patterns of conflict behavior for all dyads. Returning to my analogy of the camera, I would prefer to take a number of instantaneous pictures over the same time period used in the single exposure above. This process--much like a

movie camera--would not only identify structures or patterns which do not change over time, but it would also identify moving objects. Such a technique is available. In order to analyze all three aspects of the data cube--dyads, behavior, and time, I will cut a series of monthly slices from the data cube. Each slice will be an R-matrix of variables across dyads. Then, the slices can be stacked in "freight car" fashion, one behind the other as in Figure 11. This procedure produces a super matrix with columns equal to the number of conflict measures and rows equal to the number of nations times the number of time periods.

This super matrix can be factor analyzed to delineate patterns of interrelationships between conflict measures over both time and dyads. The factor technique, termed Super P-analysis combines both the over time variance and the over dyad variance down the columns of the matrix.

The factor loading matrix resulting from analyzing this Super P-matrix will delineate the interrelationships between the conflict measures over the series of monthly slices. These interrelationships are not strictly based upon variation in time or the variation among dyads but account for patterns of conflict variables which vary over both time and dyads. Hall and Rummel (1968) have ascertained the patterns of variation among dyads on the same set of conflict measures as those employed in this analysis for 1963. In order to do this, they held time constant as in the long photograph analogy. My study includes variations in time.

The factor loading matrices in the two studies can be compared. This comparison will ascertain the degree of influence time has in

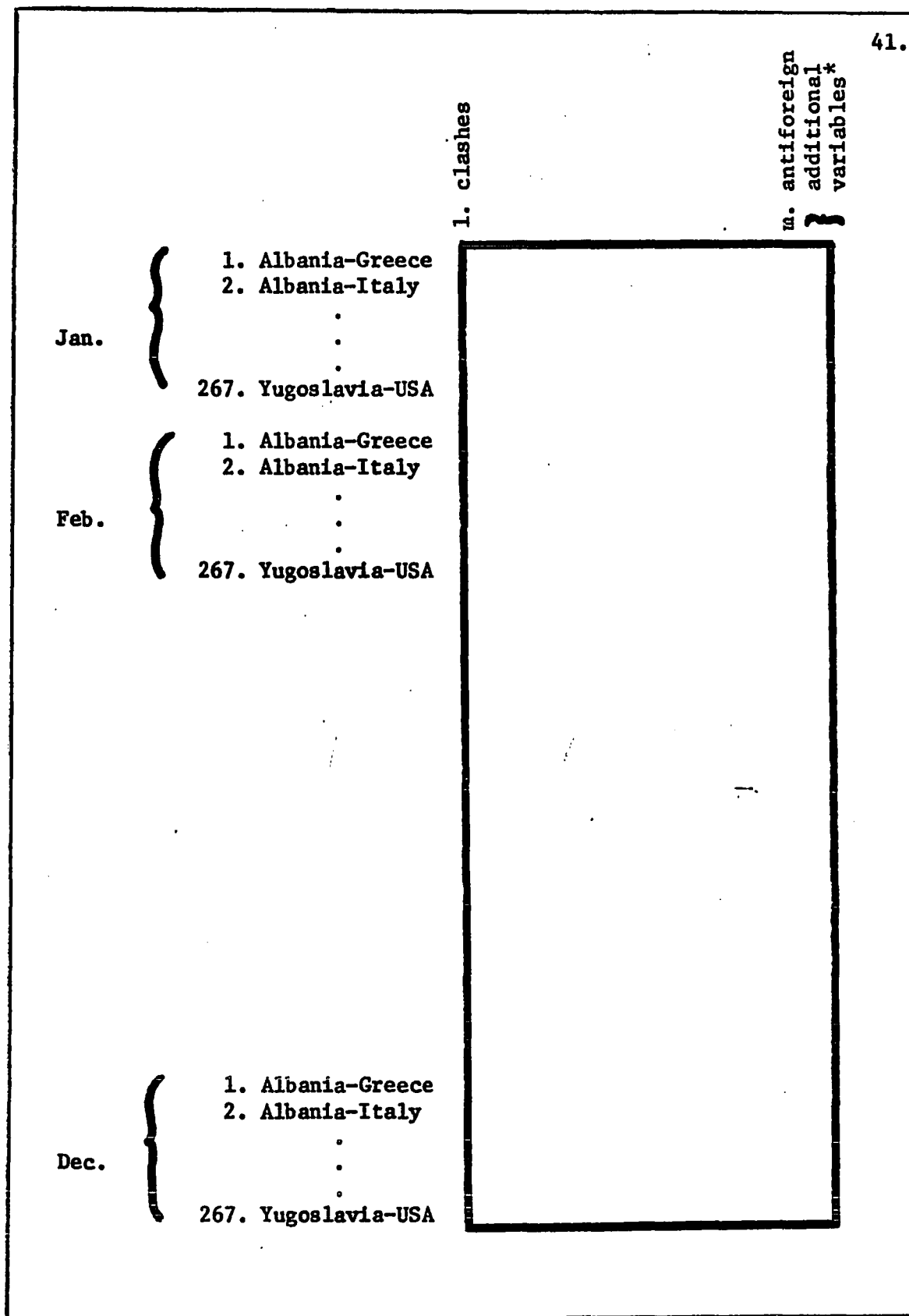


FIGURE XI - ORGANIZATION OF THE SUPER P-MATRIX

*See text p. 35

changing the patterns of conflict behavior when time is no longer held constant. If the two techniques identify different patterns of variation, then it can be concluded that the patterns of variation between dyads delineated when time is held constant are not an adequate description of the patterns of variation required for predicting changes in conflict behavior. Thus, we would have different patterns of dyadic conflict behavior along which dyads varied when the instantaneous snapshots were employed and these patterns would be more convenient in predicting changes in conflict behavior of specific dyads over time.

If the factor loading matrices of both studies are similar, however, it can be concluded that the effect of holding time constant is not important for delineating dimensions along which dyads vary over time. The factor loading matrix of the yearly patterns could be used in this case to locate the dyad's position in behavioral space among monthly time frames.

A pattern (factor) score matrix can be computed from the loading matrix discussed above. This pattern score matrix will give a monthly score for each dyad on these patterns. Plots of the change in conflict behavior of dyads can then be drawn using these scores. The traditional methods of extrapolation and time series analysis can also be applied to these scores. Once the procedures for delineating patterns of conflict behavior have been established and the changes in behavior for dyads over time charted, the problems of prediction or forecasting can be met more easily. At this stage an empirical trace or record of the behavior of each dyad will have been ascertained. An initial series of questions can be asked of the information: which dyads exhibited

similar behavior and what are the behavioral characteristics that distinguish one group from another.

The second stage of this project delineates these groups of similarly behaving dyads. This grouping of nations can be used to develop profiles of similarly behaving conflict groups. Dealing with groups and developing typologies is not a new activity for students of international relations. Reference is often made to the Soviet Bloc or the West, to the Arabs, or to the undeveloped nations in the texts of the field. The difficulty in these groupings is that the rationale underlining the grouping procedures is often not explicit enough to be usefully employed in empirical or mathematical operations.¹ In future chapters I will develop a methodology for delineating profiles of dyadic behavior.

¹The exceptions to this are:

- a. Steven Brams, "The Structure of Influence Relationships in the International System," to be published in James N. Rosenau (ed) International Politics and Foreign Policy: A Reader in Research and Theory (Rev. ed.: N.Y. Free Press, forthcoming 1969).
- b. Bruce Russett, International Regions and the International System: A Study in Political Ecology, Rand McNally, (Chicago, 1967).
- c. R.J. Rummel, The Dimensions of Nations, forthcoming.

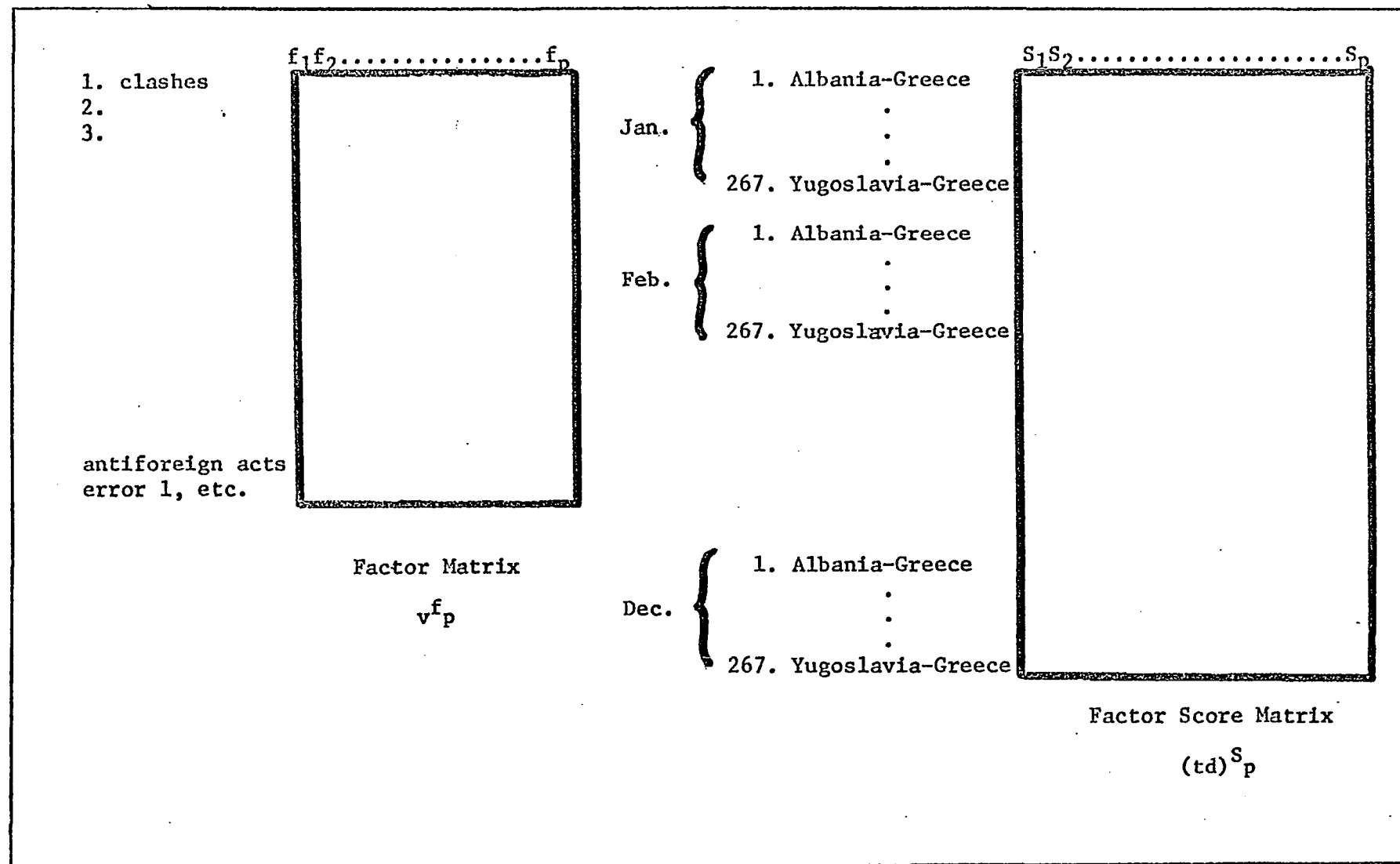


FIGURE XII - ORGANIZATION OF THE FACTOR LOADING AND FACTOR SCORE MATRICES IN SUPER P-ANALYSIS

CHAPTER V

PATTERNS OF DYADIC CONFLICT BEHAVIOR

Matrix Notation

Due to the novelty of both this approach and of matrix notation to students of international relations a short discussion of the matrix symbols seems desirable. The figures which follow in the research design will refer mostly to matrices. These matrices will be organized in the normal, two-dimensional form of rows and columns. Normally, a matrix is signified by a capital letter, which designates the type of matrix, and small case letters to each side, signifying the meaning placed on rows and columns. Thus:

$${}^M_r c$$

would be a matrix M with rows r and columns c. Figure 7 the matrix of the Hall and Rummel study, would be:

$$267 {}^C_{23}$$

or a conflict matrix of 23 variables over 267 dyads. An exception to normal practices will be necessary, in this study, however. In several matrices, either the rows or the columns will be organized in such a way as to account for two sides of the data cube. The matrix in Figure 11 is an example of such a matrix. In this case, the columns contain rows for all dyads in each of the twelve months. It could be written:

$$({td}) {}^C_v$$

or a conflict matrix of variables (v) over time (t) and dyads (d). The following table displays the notations most commonly employed in this paper.

TABLE II. MATRIX NOTATIONS

F	factor loading matrix
f	a specific factor loading vector
S	factor score matrix
s	a specific factor score vector
t	number of time periods
m	general case for time
d	number of dyads
e	general case for dyads
p	number of factors
l	general case for factors
v	number of variables
$d^S(tp)$	A factor score matrix of time and factors over dyads.
$(tp)^S_p$	A factor score matrix of factors over time and dyads.
v^F_p	A factor loading matrix of factors over variables.

Transformations

Three separate problems will be discussed in this sub-section:

1. What sort of standardization should be adopted?
2. Do we wish to transform any of the data?
3. Which correlation procedure is to be adopted?

1. Standardization. The effect of standardization is to remove all variance from the data associated with differences in means and standard deviations between variables. There are several potential ways to standardize this matrix. The variables could be standardized over dyads within each month. This would equate the means of each month's activities and wash out the magnitude shifts due to crises or other abnormal periods.

Another form of standardization would be to standardize the rows of our matrix. Standardization in this way would equate the mean amount

of activity for each dyad. We could then look at differences within dyads over time. This type of analysis would require that the researcher be confident about the frequencies of each of the conflict variables. This would be too strong an assumption, given our data source. Moreover, the questions being asked of the data are not related to within dyad differences, but rather, to those between dyads, or more appropriately, over all dyads.

A third approach would be to standardize each dyad's behavior over the twelve months on a specific variable. This is an appealing standardization procedure as it would reduce the effect of dyads which exhibit a constantly high frequency of conflict behavior as measured by all variables. This does not happen in conflict behavior, however. Previous analysis has shown that certain dyads may be high in some conflict behavior variables but do not display a high frequency on certain other conflict variables (Young and Martin, 1966). My analysis will want to take into account the high occurrence of certain variables for specific dyads.

What remains, then is the possibility of standardizing down the columns of the total matrix and thus equating the means of each variable over all dyads and all time periods. This form of standardization is done by the correlation coefficient to be computed between the variables.

2. Data Transformations. Statisticians working with random samples argue that it is necessary to transform data with highly skewed distributions to more normal distributions. This argument is valid when the researcher is dealing with purely random samples and is attempting to base his judgments on significance tests, where he

feels worried about rejecting a true hypothesis.

No data transformation will be applied to the data in this analysis for three reasons. First, I am dealing with the population of conflict dyads for 1963. There is no need to make inferences from random samples. Secondly, we are interested in describing the behavioral space of conflict behavior over time. We will be interested in describing the percentage of variance in one variable that is related to the variance in another variable, and not in interpreting significance tests. Thirdly, other analyses on 1963 as a single point in time have not transformed their matrix (Hall and Rummel, 1968). For us to transform any data in this analysis would make comparisons more difficult.

3. Correlation Procedures. There are several correlation coefficients to choose from for accessing the intercorrelation among the measures. Because the distribution of the conflict data in previous analyses have been non-normal, generally J distributions, and because some of the data will be dichotomous, thought must be given as to which correlation coefficient would provide the most meaningful results. The rank correlation methods were ruled out because of the high number of tied scores due to the frequency of zero's in the matrix. Tetrachoric and phi-over-phi-max are ruled out because of the continuous nature of many of the conflict variables. The product moment coefficient is applicable to both dichotomous and continuous data. Moreover, it was the coefficient chosen in the earlier study of Hall and Rummel. Its use in this analysis would facilitate comparisons.

Dimensions of International Conflict

The data matrix described to this point will be factor analyzed

employing principal component analysis. The principal axis solution will be rotated to orthogonal and oblique solutions. I have chosen component analysis because the specific variance is important in the description of conflict behavior. Previous works have also used component analysis in describing total variance in dyadic conflict behavior (Rummel, 1963, and Hall and Rummel, 1968).

In addition, I plan to employ the factor scores derived from the factors of conflict behavior and the component model will allow better estimates of true factor scores than would common factor analysis (Rummel, 1969). Another reason is that earlier work of Rummel has found that some variables are specific to a single dimension, for example, anti-foreign demonstrations form one dimension in the 1955 dyadic behavioral conflict analysis (Rummel, 1967). I would not want to lose these specific factors.

The first matrix which will be derived by factoring our multifaceted grid is a factor loading matrix. The matrix will represent all of the variables in the rows and the columns will represent each of the factors. A principle axis solution was initially derived. The first factor in this solution attempts to account for the largest pattern of interrelationships among the conflict measures. The second factor delineates the next largest pattern that is uncorrelated with (independent of) the first pattern and so on until all variation is accounted for in the data.

Table III displays the unrotated (principle axis) matrix of international conflict. The triangular correlation matrix is given in Table IV. The first six dimensions account for 51.1% of the total

TABLE III. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a

MEASURES	UNROTATED FACTOR MATRIX ^b					
	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆
1 WARNDF	33	-11	(51)	15	18	(71)
2 ALRTMB	31	-12	49	15	17	(73)
3 PLNVIL	44	(81)	-09	20	-02	-02
4 WARACT	44	(82)	-09	19	-03	-00
5 DISCMA	37	(78)	-09	16	-02	-01
6 DAYVIL	24	(55)	-07	12	-02	-01
7 NEGACT	26	-07	41	13	(70)	-45
8 UNCNEG	18	-05	27	06	37	-38
9 SEVDPR	10	-03	34	09	45	-03
10 EXPREC	08	-05	14	05	37	-32
11 BCOTEM	04	-03	10	05	31	-22
12 AIDREB	13	08	05	07	16	-03
13 NEGCOM	(83)	-42	-23	01	-11	-03
14 WRTCOM	(60)	-34	-28	-03	-13	-15
15 ORLCOM	48	-24	-12	02	-06	-01
16 ACCUSN	(72)	-35	-22	-03	-09	-05
17 PROTST	(52)	-28	-20	03	-09	-09
18 MINTHM	48	-16	-06	08	-02	05
19 UNOFVL	14	-01	(76)	09	(-51)	-17
20 ATKEMB	12	-01	50	07	-29	-16
21 ATKPER	04	-00	46	04	-43	-27
22 ATKFLG	05	01	48	01	-45	-28
23 NVIOLB	07	01	13	08	-03	15
24 TIME	02	03	01	02	01	-07
25 RANDOM	02	-03	01	-00	03	01
26 SINE	03	-03	05	04	-04	02
27 ENGCON	-22	-21	-16	(88)	-07	-03
28 NATING	-17	-19	-16	(84)	-08	-06
29 CENSOR	20	15	09	(-70)	03	-00
% Common Variance	22.8	19.9	16.9	14.9	13.2	12.3
% Total Variance	11.7	10.2	8.6	7.6	6.7	6.3

C
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^aDecimals omitted from loadings. ^bPrincipal axes technique. ^cParentheses indicate loadings $\geq$ 50.

TABLE IV. PRODUCT MOMENT CORRELATION MATRIX^{a,b}

MEASURES	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 WARNDF														
2 ALRTMB	97													
3 PLNVIL	03	01												
4 WARACT	03	01	95											
5 DISCMA	01	00	75	79										
6 DAYVIL	00	-00	44	45	43									
7 NEGACT	13	09	04	02	01	00								
8 UNCNEG	04	02	03	00	00	-00	57							
9 SEVDPR	19	16	01	01	-00	-00	52	06						
10 EXPREC	-01	-01	-01	-01	-01	-01	45	08	02					
11 BCOTEM	-00	-00	-01	-01	-01	-01	35	03	04	04				
12 AIDREB	06	06	10	07	09	04	22	-01	-01	-01	-00			
13 NEGCOM	16	16	05	05	01	-00	09	07	-01	02	00	03		
14 WRTCOM	-01	-01	01	01	-01	-01	04	00	-01	02	-01	07	67	
15 ORLCOM	07	05	02	03	01	00	06	05	00	-01	01	-01	55	09
16 ACCUSN	10	09	05	05	01	-00	08	06	-02	01	00	06	83	58
17 PROTST	05	06	03	03	-00	-00	05	03	-01	06	01	-01	59	55
18 MINTHM	14	13	10	09	03	01	06	09	-01	03	03	-01	39	19
19 UNOFVL	23	20	02	02	-00	-00	08	06	08	01	-01	-01	01	-02
20 ATKEMB	12	08	01	02	00	-00	10	09	04	03	-00	-00	02	-01
21 ATKPER	-00	-00	-01	-01	-01	-00	02	06	-01	-01	-00	-00	-01	-01
22 ATKFLG	-01	-00	00	01	-00	-00	03	07	-01	-01	-01	-00	-01	-01
23 NVIOLB	10	11	03	04	01	00	01	-01	05	-01	-01	-01	01	01
24 TIME	-01	-01	03	01	01	03	03	04	-01	03	-03	01	-01	01
25 RANDOM	-00	-00	-01	-01	-00	-02	02	-04	07	00	-00	03	01	03
26 SINE	03	03	-01	-01	-00	00	-00	01	01	01	-02	-03	02	01
27 ENGCON	-03	-03	-08	-09	-08	-04	-03	-03	-03	-01	01	-02	-04	-04
28 NATINC	-03	-03	-05	-06	-06	-03	-00	-02	-02	00	-00	01	-01	02
29 CENSOR	00	01	06	06	07	04	01	01	01	-01	01	-00	06	07

^aCorrelations rounded off and multiplied by 100.^bN = 3,204

TABLE IV. (Continued) PRODUCT MOMENT CORRELATION MATRIX

MEASURES	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16 ACCUSN	46														
17 PROTST	15	22													
18 MINTHM	24	35	21												
19 UNOFVL	01	-01	-01	01											
20 ATKEMB	01	-00	01	05	48										
21 ATKPER	-01	-01	-01	-01	52	31									
22 ATKFLG	00	-01	-01	-01	69	12	20								
23 NVIOLB	-00	-00	01	04	10	03	03	-01							
24 TIME	-02	-01	01	01	00	01	02	00	02						
25 RANDOM	00	01	01	02	01	-02	-01	01	02	-20					
26 SINE	00	04	-01	02	04	03	01	03	02	-01	03				
27 ENGCON	-01	-06	-00	-01	-03	-02	-01	-05	02	-00	-00	01			
28 NATINC	-02	-05	05	-01	-02	00	00	-03	01	00	00	01	86		
29 CENSOR	01	06	05	-01	01	04	02	01	-01	00	00	-03	-59	-44	

variance of the original matrix. There is neither a general factor nor a series of bi-polar factors commonly found in principal component analysis. That no common factor appeared on which all variables loaded highly is indicative of the lack of a general concept which can account for conflict between nations. Substantiation for this conclusion can be gained by turning to the correlation matrix. High correlations are not distributed across a single row or down a column, but are clustered into groups.

The lack of a bi-polar factor indicates that there is little shifting of behavior from one form of conflict to another over time. Thus, for instance, there does not seem to be a general tendency for dyads which called up reserves and mobilized troops in one period to engage in military violence in the next period or vice versa. In other words, bi-polar factors would signify escalation or de-escalation and this form of conflict behavior is not a generally experienced pattern in 1963. If it is a characteristic of specific dyads, this information will be discerned in later analysis. At this point, however, escalation cannot be said to be a general characteristic of the conflicts in the international system.

Principal component analysis generally produces as many factors as there are variables in the original matrix. While this is true in this analysis, there seems to be a clear rationale for limiting our discussion to the first six factors. Table V lists the eigenvalue and the per cent of variance accounted for by each of the factors. The more pronounced difference between the eigenvalues for factors six and seven than the difference between factors five and six suggests that

TABLE V. EIGENVALUES AND PER CENT TOTAL VARIANCE FOR
FIRST 10 DIMENSIONS OF CONFLICT BEHAVIOR

Dimension Number	Eigenvalue	Per cent ^a Total Variance
1	3.379	11.7
2	2.952	10.2
3	2.500	8.6
4	2.205	7.6
5	1.955	6.7
6	1.822	6.3
7	1.233	4.3
8	1.125	3.9
9	1.037	3.6
10	1.007	3.5
11	0.978	3.4

^aPrincipal Axes Solution

this is a convenient place to stop interpreting the factors. For this reason, we have rotated only six factors.

When the dimensions are rotated to a more invariant position, it is more convenient to discuss the substantive labeling of the factors. While the unrotated factors define the most general factors in descending order of generality, the rotated factors delineate distinct clusters of inter-relationships when they exist in the data. Orthogonal rotation defines patterns which are uncorrelated with each other.¹ These patterns identify clusters of variables which exhibit similar behavior over dyads for successive months. The rotation technique employed in orthogonal rotation was the varimax method as described in Harman (1967, p. 304).

The first orthogonally rotated factor appears to be a negative communication factor. Variables loading above .5 are negative communication, written communication, oral communication, accusations, and protests. The second factor emphasizes official incidents of violence. Planned violence, acts of war, discriminate military action, and days of violence mark this dimension. The third factor accounts for unofficial acts of violence, such as attacks on the embassy, attacks on persons, or attacks against the flag. This dimension represents riots, and in general, unofficial discontent of the population of one nation over the behavior of another nation. The fourth factor comes out as behavior associated with negative sanctions, severance of diplomatic

¹The factor scores will be uncorrelated, but not necessarily the factor loading vectors. See Rummel (1969a).

TABLE VI. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a

MEASURES	ORTHOGONALLY ROTATED FACTOR MATRIX ^{b,c}						h ²
	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	
1 WARNDF	08	-00	05	-04	06	(97)	95
2 ALRTMB	08	-02	03	-04	03	(96)	94
3 PLNVIL	05	(94)	00	-03	03	02	89
4 WARACT	05	(95)	01	-04	01	03	91
5 DISCMA	00	(88)	-01	-05	01	00	78
6 DAYVIL	-01	(62)	-01	-02	-00	-01	39
7 NEGACT	06	01	05	-01	(97)	06	96
8 UNCNEG	07	-00	11	-03	(61)	-05	40
9 SEVDPR	-07	-02	-01	-03	(51)	27	34
10 EXPREC	02	-03	-01	01	(51)	-09	27
11 BCOTEM	-01	-02	-04	01	40	-05	16
12 AIDREB	04	12	-04	01	18	07	06
13 NEGCOM	(96)	00	01	-03	02	08	93
14 WRTCOM	(76)	-02	-00	-02	-01	-11	59
15 ORLCOM	(55)	01	01	-01	02	-06	31
16 ACCUSN	(84)	00	-01	-06	02	04	70
17 PROTST	(63)	-01	01	03	02	-03	40
18 MINTHM	48	07	01	02	05	15	27
19 UNOFVL	-02	01	(92)	-02	02	20	89
20 ATKEMB	01	01	(60)	-01	08	11	38
21 ATKPER	-02	-01	(69)	-00	-00	-05	47
22 ATKFLG	-01	00	(72)	-04	-01	-05	52
23 NVIOLB	00	04	07	03	-02	21	51
24 TIME	00	04	03	01	05	-04	01
25 RANDOM	02	-02	-02	-00	02	03	00
26 SINE	03	-01	06	03	-01	05	01
27 ENGCON	-02	-05	-01	(95)	-01	01	90
28 NATINC	02	-02	01	(90)	00	-01	81
29 CENSOR	06	04	01	(-74)	-00	-04	56
% Common Variance	21.4	20.1	15.0	15.4	13.9	14.2	
% Total Variance	11.0	10.3	7.7	7.9	7.1	7.3	

^aDecimals omitted from loadings. ^bParentheses indicate loadings $\geq .50$.^cVarimax technique.

relations, expulsion of representatives and boycott. These all seem to be interrelated in this dimension. The last dimension accounts for alert mobilizations, unaccustomed troop movements, and other tacit warnings exchanged between nations.

Substantively, the independence of these five patterns means that there are five separate types of dyadic conflict behavior which vary independently of each other over the successive months of 1963. No variable loaded highly ($>|30|$) on more than one dimension. This indicates that the conflict behavior of one type is not common to two or more conflict patterns. This finding does not apply to specific dyads but it does imply that there are five distinctly independent patterns of systemic conflict behavior.

Possible Effects of Error

As discussed in Chapter III, several variables were included in the analysis to check for both systematic and random error. The sixth factor shows loadings for energy consumption, national income, and censorship variables which were included to check for possible systematic error due to overemphasis of specific types of dyads. These variables employed in the analysis to check for systematic error all seem to be highly related to each other but not related to conflict. This conclusion was born out in the product moment correlation matrix. No other variable has a meaningful correlation with these "error" measures. In the factor loading matrix the conflict variables all load below .06 on this factor. In addition, these three variables do not load on any of the other factors above this level (.06). It would appear that insofar as these three variables index a potential for

systematic error, it is not present in this analysis.

The camera analogy can be reintroduced at this point. My analysis is a series of instantaneous snap shots. The systematic error variables remain constant from period to period and only vary over the dyads. They are somewhat like the buildings in the photography analogue. Since all three error measures load on the same factor and very little conflict behavior is related to this factor, conflict behavior is assumed to be independent of these more constant attribute measures. Thus, the conflict behavior of powerful, economically developed, open societies do not automatically receive more news coverage than other dyads.

Turning to the possibility of random error, the communality of the random number variable included in this analysis over all six factors is .002, suggesting that it is unlikely that random error has a large effect upon the structure delineated by these six dimensions. The communality for the conflict variables indicates that some are more highly accounted for by the matrix than others. Several variables have a communality so low as to make any attempted interpretation of their meaning dubious. Thus, boycott, aid to rebels, and non-violent behavior are not interpretable in this structure. I chose to disregard them in interpreting any further analysis.

Two other variables were included in the analysis to measure the relevance of time. The first variable increased monotonically with the months while the second variable traced out a sign curve to represent high scores for spring through summer and increasingly low scores from fall into winter for the northern hemisphere. In both cases the communalities were so low that there was no possibility to interpret

these variables. Conflict behavior is, therefore, not monotonically related to time and my simple apriori judgment about a sign curve is not relevant either. This implies that the patterns of conflict behavior do not grow in intensity over time in a simple monotonic fashion, but vary in intensity in more irregular fashion.

The error variables were removed from the original matrix at this stage and the factors were recomputed. From this point on the analysis concerns only the variation in conflict variables and inclusion of variation from the six variables measuring error and time sequencing would tend to confuse interpretation of results in future chapters. The orthogonally rotated factor matrix for five conflict factors using only 23 variables is presented in Table VII. The factors maintain the same substantive interpretation that they had in the previous discussion.

A oblique factor matrix is presented in Table VIII. The criteria used in rotation is biquartimin (Harman, 1967, p. 314). While orthogonal rotation sought out only uncorrelated patterns, oblique techniques search out patterns regardless of their correlation and are thus more flexible. In this study the factors from the two rotations are identical in interpretation, however. The correlation between the oblique factors are presented in Table IX.

The Relationship Between Multiple Time Sequences and Cross Sectional Analysis of Conflict

The factor loading matrix derived from this analysis can be compared with the loading matrix in the earlier work of Hall and Rummel (1968) which considers 1963 as a single point in time. As discussed previously, this comparison will help ascertain the effects of holding

TABLE VII. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a

MEASURES	ORTHOGONALLY ROTATED FACTOR MATRIX ^{b,c}					h ²
	F ₁	F ₂	F ₃	F ₄	F ₅	
1 WARNDF	09	-01	03	07	(97)	95
2 ALRTMB	09	-02	01	03	(96)	94
3 PLNVIL	05	(94)	01	02	03	89
4 WARACT	05	(95)	01	00	04	91
5 DISCMA	-00	(88)	-00	01	01	78
6 DAYVIL	-02	(62)	-01	-01	-00	39
7 NEGACT	06	01	06	(97)	06	96
8 UNCNEG	07	00	12	(61)	-05	40
9 SEVDPR	-07	-01	-01	(52)	27	34
10 EXPREC	02	-03	00	(51)	-09	27
11 BCOTEM	-01	-02	-03	40	-06	17
12 AIDREB	04	12	-04	18	07	06
13 NEGCOM	96	01	00	03	08	93
14 WRTCOM	(76)	-02	-01	-01	-11	59
15 ORLCOM	(55)	01	00	02	05	31
16 ACCUSN	(84)	01	-01	02	03	70
17 PROTST	(63)	-01	-00	02	-03	40
18 MINTHM	49	07	01	05	15	26
19 UNOFVL	-01	00	(92)	01	22	89
20 ATKEMB	01	01	(60)	08	12	38
21 ATKPER	-01	-01	(69)	-01	-04	48
22 ATKFLG	-01	-00	(72)	-02	-04	52
23 NVIOLB	00	03	06	-02	21	05
% Common Variance	25.4	23.8	17.7	16.4	16.9	
% Total Variance	13.8	12.9	9.6	8.9	9.2	

^aDecimals omitted from loadings.^bParentheses indicate loadings $\geq$.50.^cVarimax technique.

TABLE VIII. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a

MEASURES	OBLIQUELY ROTATED FACTOR MATRIX ^{b,c}				
	F ₁	F ₂	F ₃	F ₄	F ₅
1 WARNDF	08	04	-04	02	(97)
2 ALRTMB	08	01	-05	00	(96)
3 PINVIL	03	01	(94)	01	-00
4 WARACT	03	-01	(95)	01	00
5 DISCMA	-01	-00	(88)	-00	-02
6 DAYVIL	-02	-01	(62)	-00	-02
7 NEGACT	04	(97)	00	06	03
8 UNCNEG	06	(61)	-00	13	-06
9 SEVDPR	-07	(51)	-02	-01	26
10 EXPREC	01	(51)	-03	00	-10
11 BCOTEM	-01	40	-02	-03	-06
12 AIDREB	04	18	12	-03	06
13 NEGCOM	(96)	01	-01	-00	06
14 WRTCOM	(76)	-02	-02	-01	-12
15 ORLCOM	(55)	01	-00	00	04
16 ACCUSN	(84)	01	-00	-01	02
17 PROTST	(63)	01	-01	-00	-04
18 MINTHM	48	04	06	00	13
19 UNOFVL	-01	01	-00	(92)	20
20 ATKEMB	01	08	00	(59)	11
21 ATKPER	-01	-01	-01	(69)	-04
22 ATKFLG	-01	-01	00	(72)	-05
23 NVIOLB	00	-03	03	06	21
Sum of Squares	317	205	298	221	210

^aDecimals omitted from loadings.^bParentheses indicate loadings $\geq$.^cPrimary Pattern Matrix - Biquartimin Technique, 50 Iterations, 30 Cycles.

TABLE IX. CORRELATIONS BETWEEN PRIMARY OBLIQUE FACTORS

Dimension Name	1	2	3	4	5
1. Negative Communications	1.00				
2. Official Incidents of Violence	- .03	1.00			
3. Unofficial Acts of Violence	- .02	- .02	1.00		
4. Negative Sanctions	- .00	.01	.01	1.00	
5. Warning and Defensive Acts	- .02	- .04	- .06	- .02	1.00

time constant in the cross sectional analysis. The loading matrices will be compared by canonical regression analysis. Canonical analysis ascertains the maximum linear relationship between each set of factors.² If the factors are identical in both studies, there should be a perfect one-to-one matching of dimensions from each conflict space. For a full discussion of the canonical model, see Phillips and Hall (1968) and Hooper (1959).

The trace correlation which relates the overall spaces spanned by five conflict dimensions in each of the two studies was .90. Approximately 81% of the variance is in common between the two loading matrices. The canonical correlations between each of the canonical variates and the canonical variates themselves are presented in Table X. Negative sanctions is the only conflict dimension that is not seen to be strongly related between the two studies. While the spaces do account completely for variance on negative sanctions, the patterns from each of the two studies do not load highly on a single variate but are spread out over two or three variates. The implications of this finding is that holding time constant does not effect the parameters of conflict behavior over time. The factor loading matrix derived in the 1963 two-facet, R-analysis of Hall and Rummel could have been used to delineate patterns (factor) scores for dyadic conflict behavior for each of

²Canonical analysis produces a coefficient which explains the amount of variance in one space which can be predicted given knowledge about the basis of the second space. The technique makes no assumption of independence or dependence associated with regression or factor comparison techniques. For a discussion see Donald F. Morrison, Multivariate Statistical Methods, 1967, McGraw Hill, N.Y., Chapter 6.

TABLE X. CANONICAL VARIATES FOR COMPARISON BETWEEN
1963 CROSS SECTIONAL STUDY AND THIS ANALYSIS

Canonical Coefficients	Canonical Variates					
	1 ^a	2	3	4	5	
1. Negative Communications	.26	(-.75)	.06	-.38	(.51)	Current Study
2. Official Incidents of Violence	-.17	.15	(-.71)	.08	(.52)	
3. Unofficial Acts of Violence	(-.88)	-.14	.43	-.20	.44	
4. Negative Sanctions	.41	.39	(.55)	.00	(.50)	
5. Warning and Defensive Acts	.02	.36	-.20	(-.91)	.24	
Canonical Correlations	.99	.98	.95	.86	.68	
1. Negative Communications	.21	(-.70)	-.08	-.40	.47	Hall Rummel Study
2. Unofficial Acts of Violence	(-.91)	-.05	.33	-.25	.47	
3. Official Incidents of Violence	.14	-.25	(.74)	-.13	(-.51)	
4. Warning and Defensive Acts	.00	.49	-.20	(-.87)	.21	
5. Negative Sanctions	.34	.45	(.54)	.00	(.51)	

Trace Correlation = .90

^a Parentheses indicate coefficients above .5

the months of 1963.

The monthly slices of conflict behavior contained a great number of zero cells, that is, cells which recorded no conflict behavior. There was concern that monthly periods were too short in duration, that perhaps three-month periods would be more applicable. In order to check the stability of the factors for a one-month period as opposed to other time periods, the year was divided into four, three-month periods. These periods (January-March, April-June, July-September, October-December) were factor analyzed separately. Then, canonical analysis was used to measure the relationship between the structure of each of these periods and the overall over time structure delineated in this analysis. The trace correlations for the four, three-month periods are .89, .92, .96, and .95, respectively. The rotated factor loadings and the canonical variates for each of these three-month periods are presented in the appendix.

These two sets of findings concerning the stability of the parameters in dyadic conflict behavior suggests that once any time frame is analyzed the loading matrix from that study can be employed to calculate scores for a number of different sized time slices. The implications for this discovery are that the loadings of either this study or the Hall and Rummel study ought to be usable in estimating parameter scores for monthly conflict behavior in 1964.

A factor (pattern) score matrix was computed for the orthogonally rotated conflict patterns. Since the number of factors employed in this study is less than the number of variables, regression methods must be used to estimate the factor scores. The actual equation is:

$$(td) S_p = (td) V_v^T V_v^R^{-1} V_v^F p$$

where $(td) S_p$ is a matrix of estimated factor scores.

$(td) V_v$ is one of the standardized variables.

$V_v^R^{-1}$ is the inverse of the correlation matrix, and

V_v^F is the factor loading matrix.

The factor score matrix will include scores for each of the 267 dyads in each of the 12-month periods in the rows, and the columns will represent the patterns or factors of conflict behavior. Figure 12 demonstrates this matrix. The scores are standardized with a mean of zero and a standard deviation of 1.0. The length of this matrix is 12 time periods X 267 dyads, or 3,204 scores along each factor pattern. Plotting these scores would require a chart of considerable length and would be difficult to interpret. Instead, a mean score for each month was calculated on each of the five conflict patterns. This score is the average dyadic score for each pattern for each month. Plots of these five average pattern scores are presented in Figures 13 to 17. The zero line in the chart represents the mean score for each specific pattern on all 3,204 observations. The points that are plotted represent mean scores for the 267 dyads in each specific month. The following discussion can be considered to refer to systemic changes in conflict behavior. A discussion of plots of specific scores from the factor score matrix would refer to dyadic change in conflict behavior.

The first pattern plotted was for mean scores from the negative communication pattern. This pattern reached a peak in July through

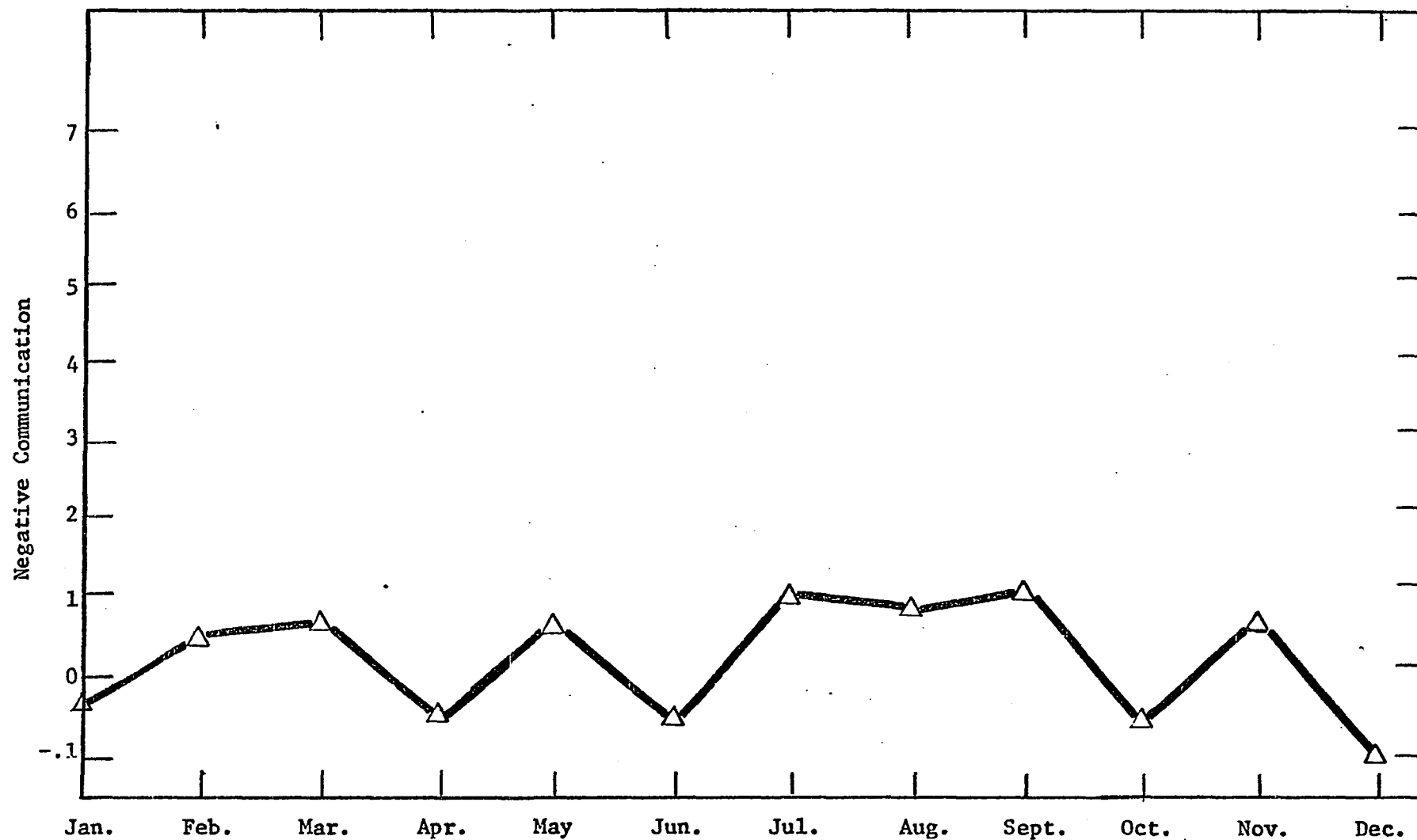


FIGURE XIII - AVERAGE MONTHLY SCORES ON NEGATIVE COMMUNICATIONS

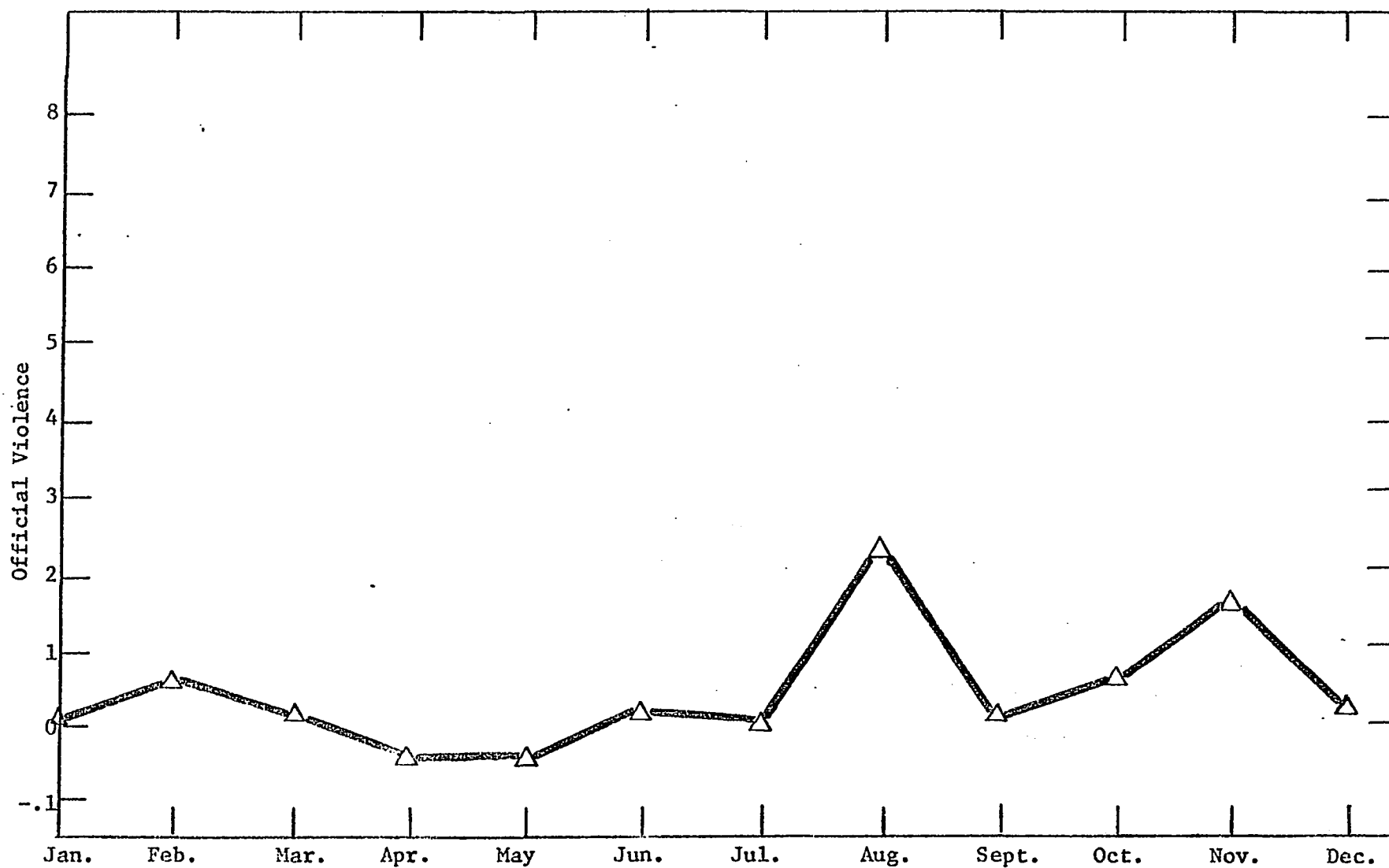


FIGURE XIV - AVERAGE MONTHLY SCORES ON OFFICIAL VIOLENCE

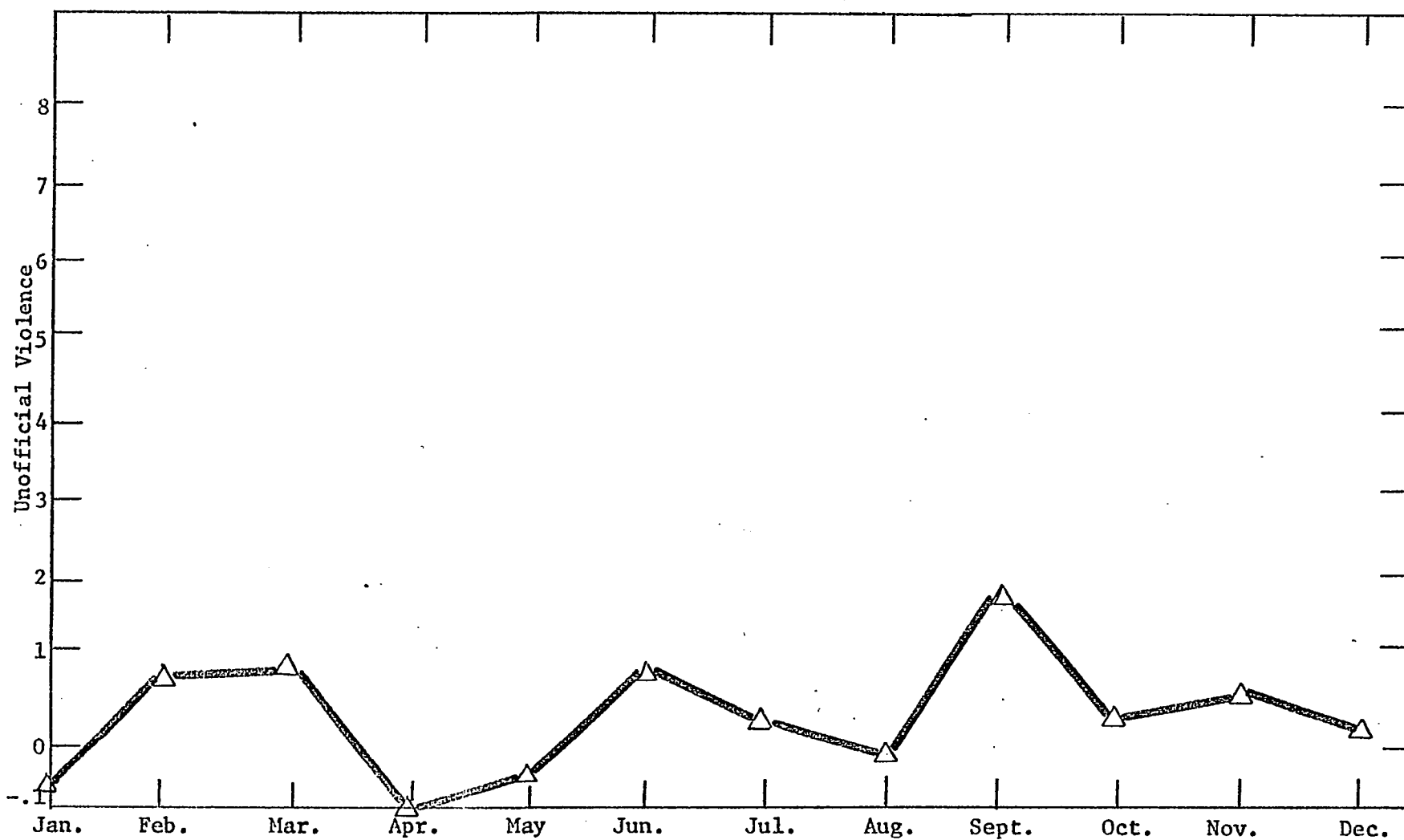


FIGURE XV - AVERAGE MONTHLY SCORES ON UNOFFICIAL VIOLENCE

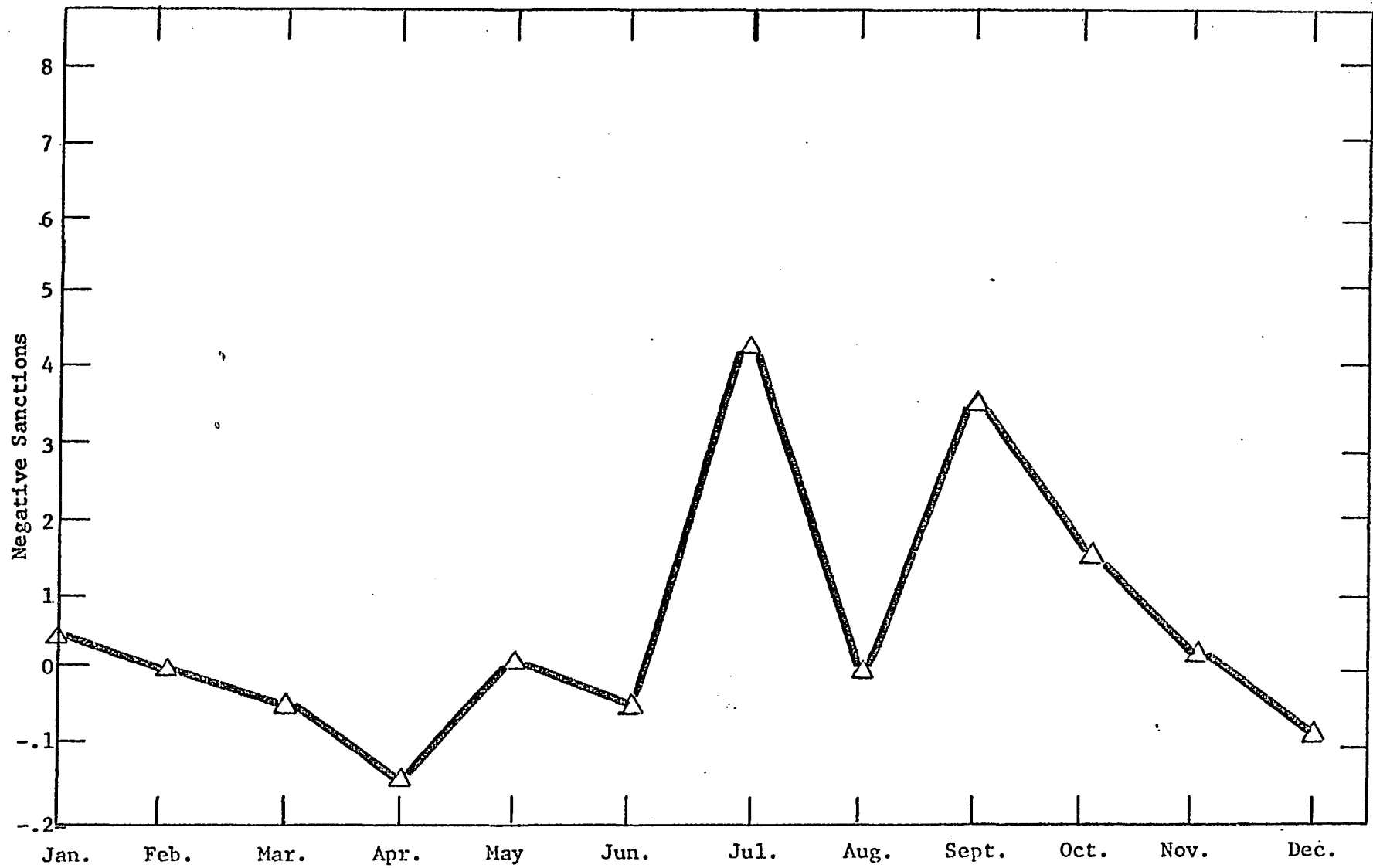


FIGURE XVI - AVERAGE MONTHLY SCORES ON NEGATIVE SANCTIONS

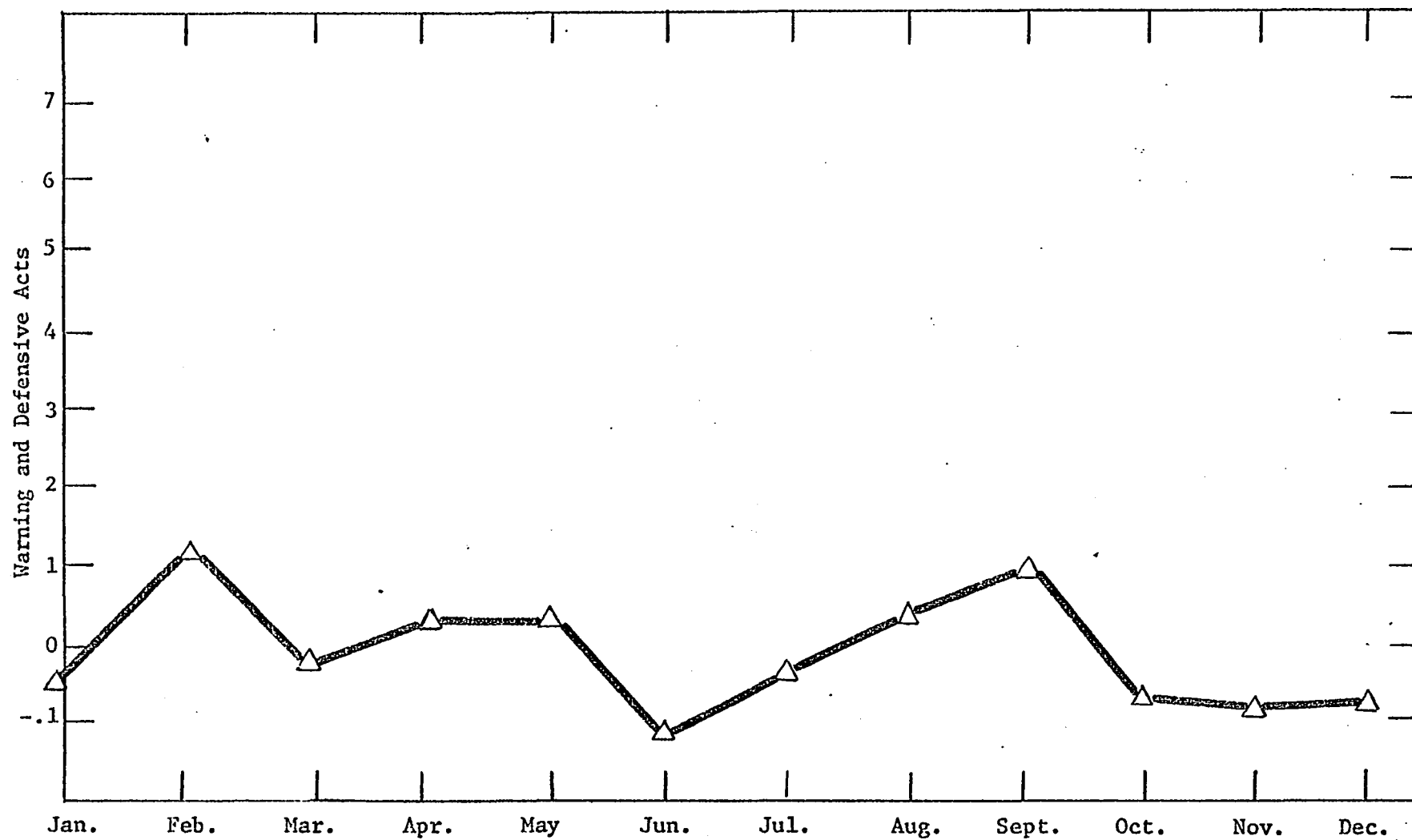


FIGURE XVII - AVERAGE MONTHLY SCORES ON WARNING AND DEFENSIVE ACTS

August. The period coincides with the Soviet's disagreement with the Chinese over Soviets relations with the West. It is also the point at which the Malaysian Federation was founded and the conflict between the Federation and Indonesia began. An interesting trend is noticeable in this pattern. Note the zig zag of the line connecting the points. In February, April, June, August, and October the mean scores are less than those scores for the next months in each case. Mathematically, this can be expressed as:

$$t_{i+1} > t_i \quad \text{where } i = 2, 4, 6, 8, 10$$

If this pattern holds up in 1964, January and every odd numbered month would be expected to exhibit a lower mean score on the negative communication pattern than the months immediately afterwards.

Official acts of violence, the second pattern, reaches two periods of relatively high incidents of occurrence. These periods are August and November. Both the Syrians and the Jordanians clashed with Israel in August and the Israeli and Syrians fought in November. Neither the Malaysian nor the Haitian crisis periods signified amounts of official violence in the magnitude range of the Israelian-Arab conflict periods.

Unofficial acts of violence displays three periods of relatively high mean scores in March, June, and September. There are three months between each systemic high for unofficial conflict. Perhaps more important, however, is the fact that the lows reached after each high are progressively larger numbers. If a trend line were fit to this curve, it would be on a slant which increased over time. Perhaps analysis of 1964 will indicate a continual increase in this trend line or,

there may be a cyclic pattern in the trend line itself. The analysis of trend lines is a possible avenue of research that can be taken once the pattern scores have been delineated as they were here.

The average scores for negative sanctions reached values greater than the other five patterns. While the scores are not strictly comparable, since they are standardized only over their own patterns, it is correct to say that negative sanctions exhibited greater fluctuations in average scores than the other patterns. The highest were reached in July and September. Warning and Defensive acts showed mild fluctuations with no striking patterns. Interpretation of this pattern must await future chapters.

One final observation: April is the month in which four of the five patterns exhibit less than the overall average score. The only pattern not reaching such a low score was warning and defensive acts. Conflict mean scores seem to be low in December also. With President Kennedy's death in November, 1963, it was felt that the system experienced a lull in conflict behavior until President Johnson's style of acting became clear. Later analysis will point out that this observation holds true only for the system and not for specific dyads.

CHAPTER VI

THE GROUPS OF NATION DYADS DISPLAYING SIMILAR PATTERNS OF DYNAMIC CONFLICT BEHAVIOR

The Grouping of Dyads

The results of the above analyses included a matrix of factor scores. These scores locate the dyads in foreign conflict space as defined by the dimensions of dynamic conflict. At this stage a very interesting question can be asked of the cases: "How similar are the dyads to each other?"

The first step in grouping dyads will be to reorganize the factor score matrix. The order of the matrix was originally factors over time and dyads:

$$(td)^S_p$$

where:

S = matrix of factor scores

t = number of time periods

d = number of dyads

p = number of factors of conflict

We will want to reorganize this matrix so that it is time and factors over dyads:

$$d^S(tp)$$

Figure 18 shows this reorganization process. Each of the original five factors has been divided into 12 vectors. Each vector contains the pattern scores for specific months. There are five factors times 12 monthly components or 60 variables in this new matrix.

The spacial location of our population of 275 dyads as a point in

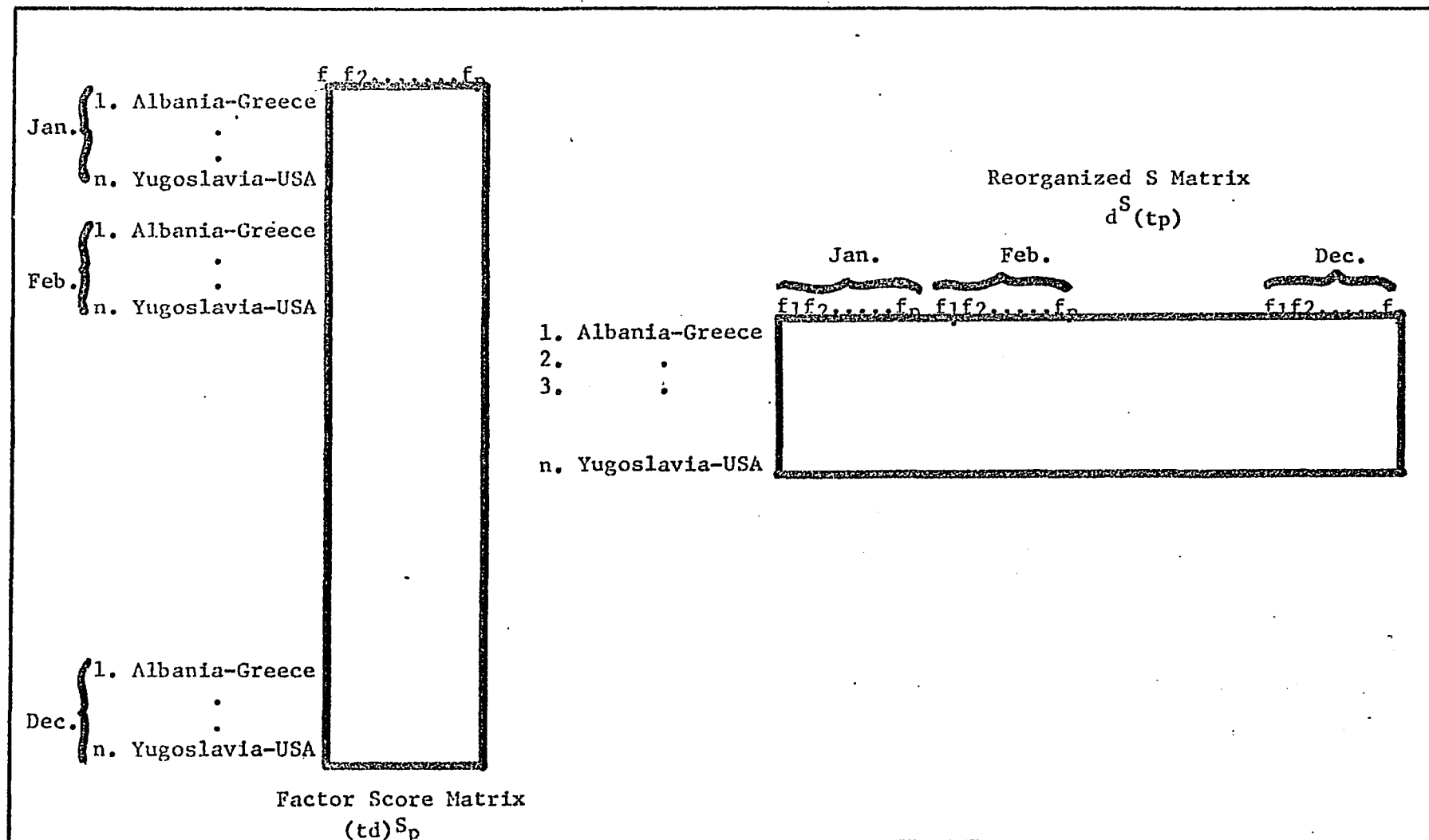


FIGURE XVIII - REORGANIZATION OF THE FACTOR SCORE MATRIX

the space of conflict dimensions and time is given by these component scores. The next step will be to define an indicator of closeness or distance for each of these points in this space from all of the other points.

The Euclidian distance measure has gained a good deal of support as a similarity measure (Cronbach and Glaeser, 1963; Nunnaly, 1962; Rummel, 1969). It measures both elevation (profile average) and scatter (profile standard deviation) similarity as well as similarity in profile shape. Thus, it determines precisely the congruence of spatial locations. The distance measure is:

$$d_{ig} = \sqrt{\sum_{fm=1}^p (S_{fmi} - S_{fmg})^2}$$

where:

S_{fmi} = dyad i's scores on a factor (f) for a given month (m).

S_{fmg} = dyad g's score on the same factor and month.

p = number of factors.

fm = that portion of a factor for a given month.

See organization of this matrix in Figure 18.

Since I have reorganized the factor scores from their original, uncorrelated arrangement, this formula must be amended for the case of oblique axes. In this case the formula is:

$$d_{ig} = \sqrt{\sum_{m=1}^p \sum_{\ell=1}^p (S_{im} - S_{gm}) (S_{i\ell} - S_{g\ell}) r_{m\ell}}$$

where:

d_{ig} = distance between dyad i and g.

S_{im} = score of dyad i on dimension m.

S_{g1} = score of dyad g on dimension 1.

r_{m1} = correlation between dimensions 1 and m .

The calculation of a distance matrix was an essential intermediate step in delineating groups. The procedure outlined above, however, would be too time consuming--approximately five hours by computer. An initial look at the correlation matrix for the reorganized factor scores as outlined in Figure 18 showed that the only product moment correlations above .10 were between the monthly components of the same pattern. Thus, while it was likely that there would be a fairly high correlation between the negative communications vector for January and the negative communications vector for September, there were no meaningful correlations between monthly components of vectors from different factors. In order to reduce the time necessary to calculate distances, only every fifth variable's correlation was included. Thus, all correlations between monthly components of the same factor were accounted for, but correlations between components of different factors were assumed to be zero.

Another preliminary step was taken before calculating the distances. All nation dyads which did not exhibit a factor score on at least one conflict dimension equal to at least 2.0 were eliminated from further analysis. This step reduced the number of dyads from 267 to 184 and was necessitated by limitations in computer programs. The elimination of these dyads merely eliminated dyads which exhibited a relatively small amount of conflict during 1963.

The method of grouping dyads based on their distances is a direct

factor analysis of the distance matrix (Rummel, 1969a, Sec. 22.2).¹

Although most texts on factor analysis have not dealt with the technique's applications in grouping cases in this manner, its use is well within the factor model and has some support in international relations (Hall and Rummel, 1968; Rummel, 1969b; and Russett, 1967). The distances are first scaled to lie between 0 and 1.00, where 1.00 is the closest point in space. This transforms the distance matrix into a similarity matrix. The similarity matrix is then factor analyzed as though it were a correlation matrix. The resulting factors define dyads whose pattern of distances from other dyads are interdependent--similar in profile. Dyads with high loadings on the same factors are similarly located in space: They form a group. The group factors can then be rotated through orthogonal and oblique solutions to delineate the best simple structure definition of groups. These groups would be distinct and without ambiguity as to the number of groups or their membership.

Direct factor analysis of the rescaled distance matrix resulted in eight orthogonally rotated factors which accounted for 85% of the variance. The first factor accounts for 79% of the variance and delineates 167 dyads with factor loadings above .50. This factor is essentially taking out those dyads with little conflict behavior. Dyads which exhibited only minor fluctuations from the mean amount of conflict behavior on each pattern in each month loaded on this factor and then exhibited loadings close to zero on the other factors. The other

¹For an example of this technique in international relations, see R.J. Rummel, "Some Attributes and Behavioral Patterns of Nations," Journal of Peace Research, 1967, No. 2, pp. 196-206.

seven factors divided some 75 dyads into groups which exhibited similar conflict behavior over both time and conflict factors. Table XI lists these groups.

Profiles of Dyadic Conflict Behavior Over Time

It is difficult to make sense out of groups, such as those in Table XI, without having some description of the profile similarity of group members. I will be characterizing a group of a given size by a taxonomic method developed by Hall (1968). To tell the underlying profile similarity of each group, I compute group averages and standard deviations for each of the columns in the transposed factor matrix as presented in Figure 18. The matrix is organized as:

$$d^S(tp)$$

I then plot these group averages and standard deviations on a graph in terms of the mean and standard scores for the 184 dyads on each of the 60 monthly patterns (12 months x 5 conflict patterns). Thus, for every column in the matrix, I will be comparing the group mean with the population (184 dyads) mean. The resultant graph for each group is exemplified in Figure 19.² A second means of displaying dyad shifts over time is to select the highest loading nation on each of the factors in the direct factor analyses which produced groupings. These dyads are the most representative dyads for each of the groups. A dyad's shift in

²Publication of the factor scores from which these profiles were derived would have required some 60 pages. The profiles themselves are each five computer pages long and would have added another 50 pages to the length of the report. Since neither is essential for the reader's understanding of the results reported on, they were eliminated from the appendix. They will be supplied upon request, however.

TABLE XI. DYADIC MEMBERS OF DYNAMIC FOREIGN
CONFLICT BEHAVIOR GROUPS*

<u>Group 2</u>	a	<u>Group 3</u>	a	<u>Group 6</u>	a
1 ALB-USR ^b	34	3 ARG-CUB	67	44 DOM-HAI	46
12 BUL-CHN	34	29 COL-CUB	67	84 INS-MAL	46
22 CHN-IND	43	35 COS-CUB	67	102 MAL-INS	80
24 CHN-USA	74	43 DOM-CUB	67	103 MAL-PHI	44
25 CHN-USR	75	48 ECU-CUB	67		
39 CUB-USA	73	53 EGP-POR	67	<u>Group 7</u>	
40 CUB-VEN	30	57 ELS-CUB	67	7 BOL-CHL	42
51 EGP-ISR	30	72 GUA-CUB	67	18 CHL-BOL	42
55 EGP-SYR	43	73 GUA-UNK	67	80 HUN-ITA	43
62 FRN-USR	43	75 HAI-CUB	67	95 ITA-HUN	42
67 GME-USA	34	79 HON-CUB	67	107 MOR-CUB	38
76 HAI-DOM	34	83 IND-UNS	67	108 MOR-EGP	48
81 IND-CHN	73	87 IRQ-BUL	61	110 MOR-SYR	42
82 IND-PAK	40	88 IRQ-GME	61	119 POL-USA	42
89 IRQ-USR	39	90 IRQ-OUT	61	156 USA-HON	42
114 PAK-IND	35	111 NIC-CUB	67	163 USA-VTS	36
120 SAU-EGP	33	115 PAN-CUB	67		
122 SOM-ETH	32	121 SEN-POR	65	<u>Group 8</u>	
132 TAI-CAN	34	150 USA-COP	61	86 IRN-USA	35
138 UNK-FRN	34	174 VEN-CUB	52	178 VEN-USA	70
142 UNK-USA	36				
143 UNK-USR	48	<u>Group 4</u>			
151 USA-CUB	38	2 ALB-YUG	87		
162 USA-USR	47	54 EGP-SAU	33		
163 USA-VTS	38	93 ISR-JOR	31		
164 USR-CHN	63	94 ISR-SYR	37		
169 USR-IRQ	41	97 JOR-ISR	31		
171 USR-SYR	30	98 KON-USA	33		
173 USR-USA	82	129 SYR-ISR	32		
174 VEN-CUB	31	184 YUG-ALB	88		
181 VTS-USA	37				
		<u>Group 5</u>			
		20 CHL-FRN	48		
		28 CHT-JAP	37		
		36 COS-DOM	49		
		41 CZE-CHN	49		
		56 EGP-UNS	51		
		82 IND-PAK	31		
		84 INS-MAL	42		
		85 INS-UNK	32		
		100 LBY-UNS	41		
		105 MEX-DOM	49		
		112 NIR-UNS	51		
		118 PHI-MLI	48		
		127 SUD-UNS	51		
		140 UNK-INS	31		
		152 USA-DOM	50		
		175 VEN-DOM	49		

a - loadings rounded off
and X 100.

*Behavior for grouping is
from the first nation to-
ward the second. Factor
analysis (principle axes
and varimax rotation) of
similarities matrix for 61
dyads. Group members who
have loadings greater than
or equal to .5 on the fac-
tor are underlined. Member
loading indicates degree to
which member approximates
group modal behavior.

^b Note nation codes are
found in Appendix I.

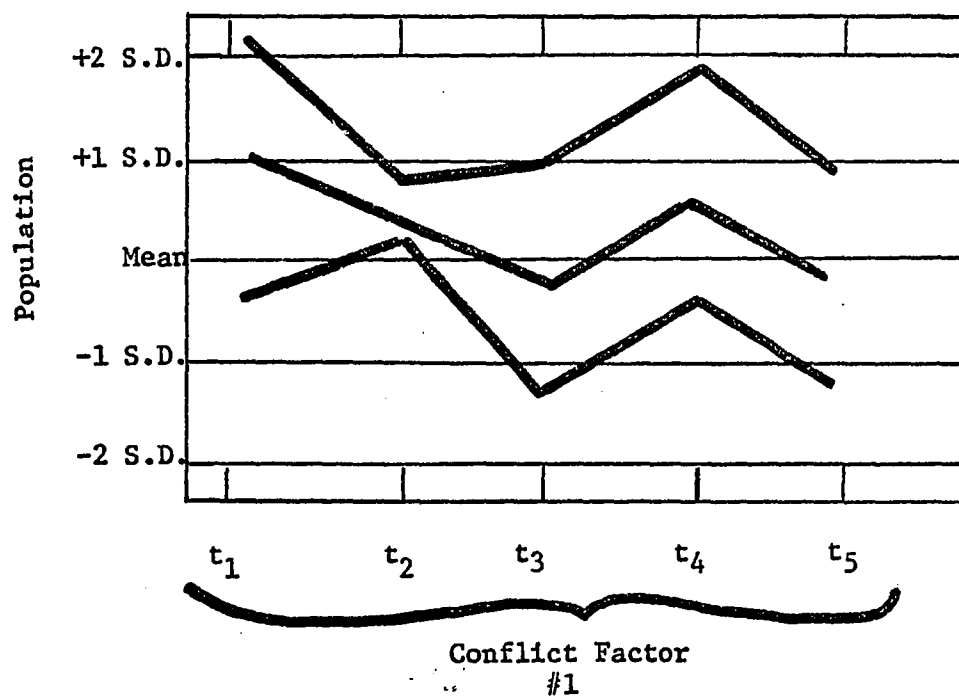


FIGURE XIX - PROFILE PLOT

conflict behavior can be plotted by considering one dimension of conflict behavior over time and locating the scores for each of these representative dyads on each of the 12 time periods.

The profile for the first group of dyads was a straight line along the population means for each monthly pattern. The implication of finding 167 out of 184 dyads in this group is that only 17 dyads exhibited consistently high amounts of conflict behavior. Thus, the distances from the other dyads were great enough to keep these 17 dyads from loading highly on the first factor. The dyads which loaded above $|.30|$ on factors two through eight and factor one engaged in occasional acts of conflict but were normally peaceful and thus displayed patterns which differed from the first group's patterns infrequently.

Group 2, whose major dyads were China to the United States, China to the Soviet Union, Cuba to the United States, India to China, the Soviet Union to China, and the Soviet Union to the United States, was demarcated by activity along the negative communication factor. This group was termed a cold war grouping which included the Soviet Union, United States accusations and counter-accusations aimed at each other as well as the Chinese activity against both the Soviet Union and the United States. This group of dyads exhibited what is normally termed "hard talk" rather than physical violence.

Plots of specific dyads are presented in Figures 20-22. The vertical axis designates the factor score values for dyads, while the horizontal axis designates the twelve time points along which patterns scores were calculated. These scores are standardized with a mean of zero and standard deviation of 1.0 for each pattern on the 3,204

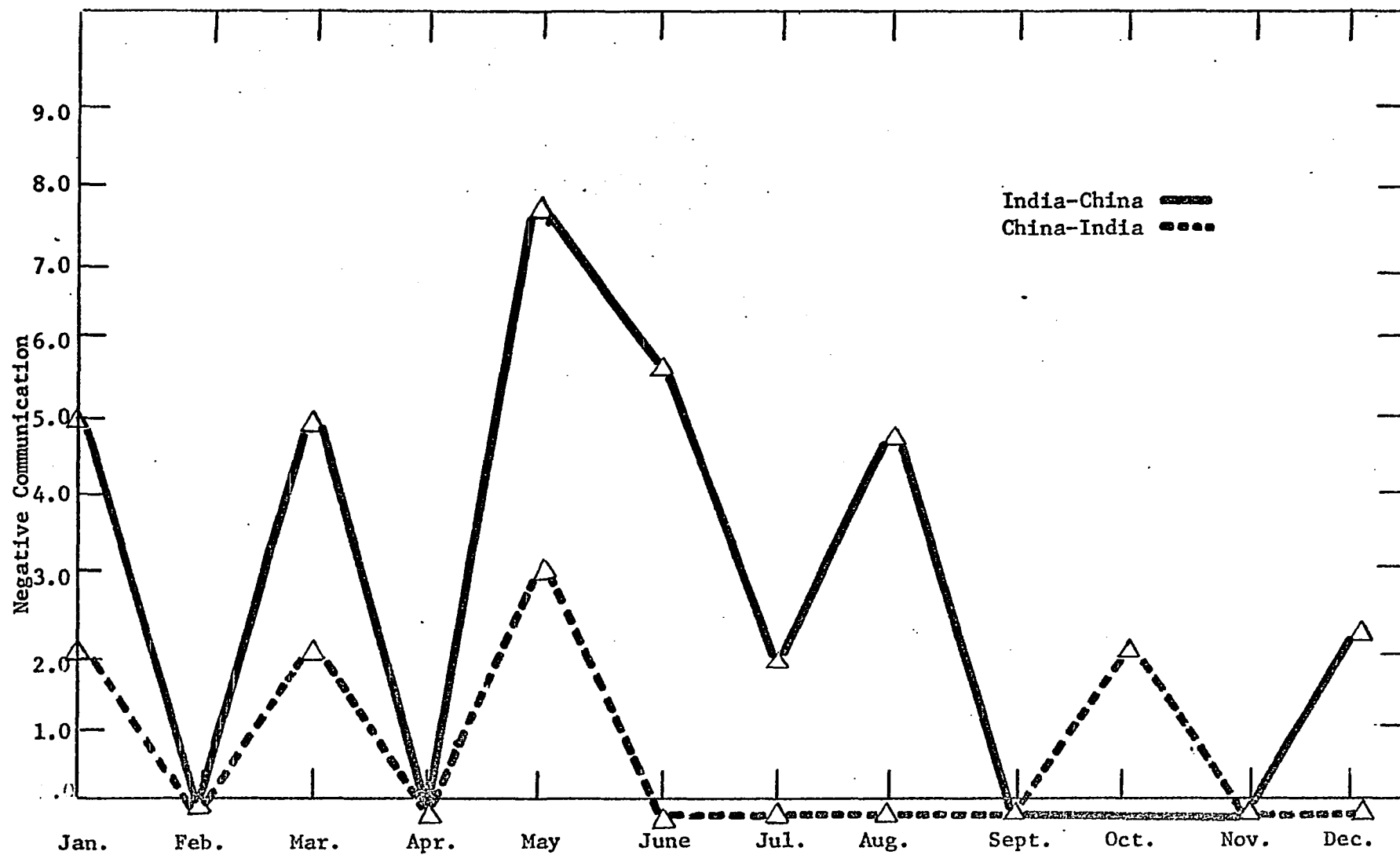


FIGURE XX - CHINESE-INDIAN CONFLICT BEHAVIOR

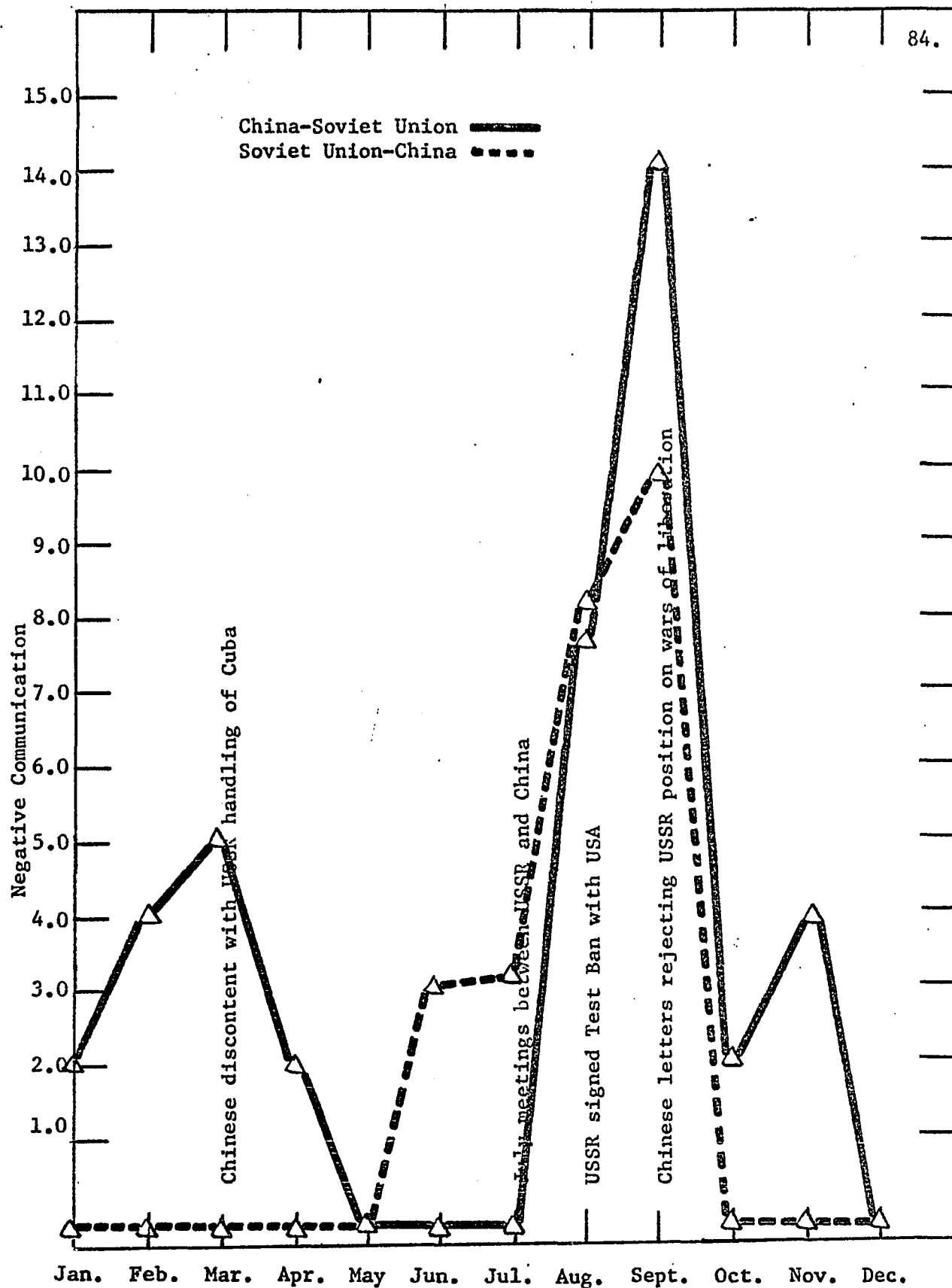


FIGURE XXI - CHINESE-SOVIET UNION CONFLICT BEHAVIOR

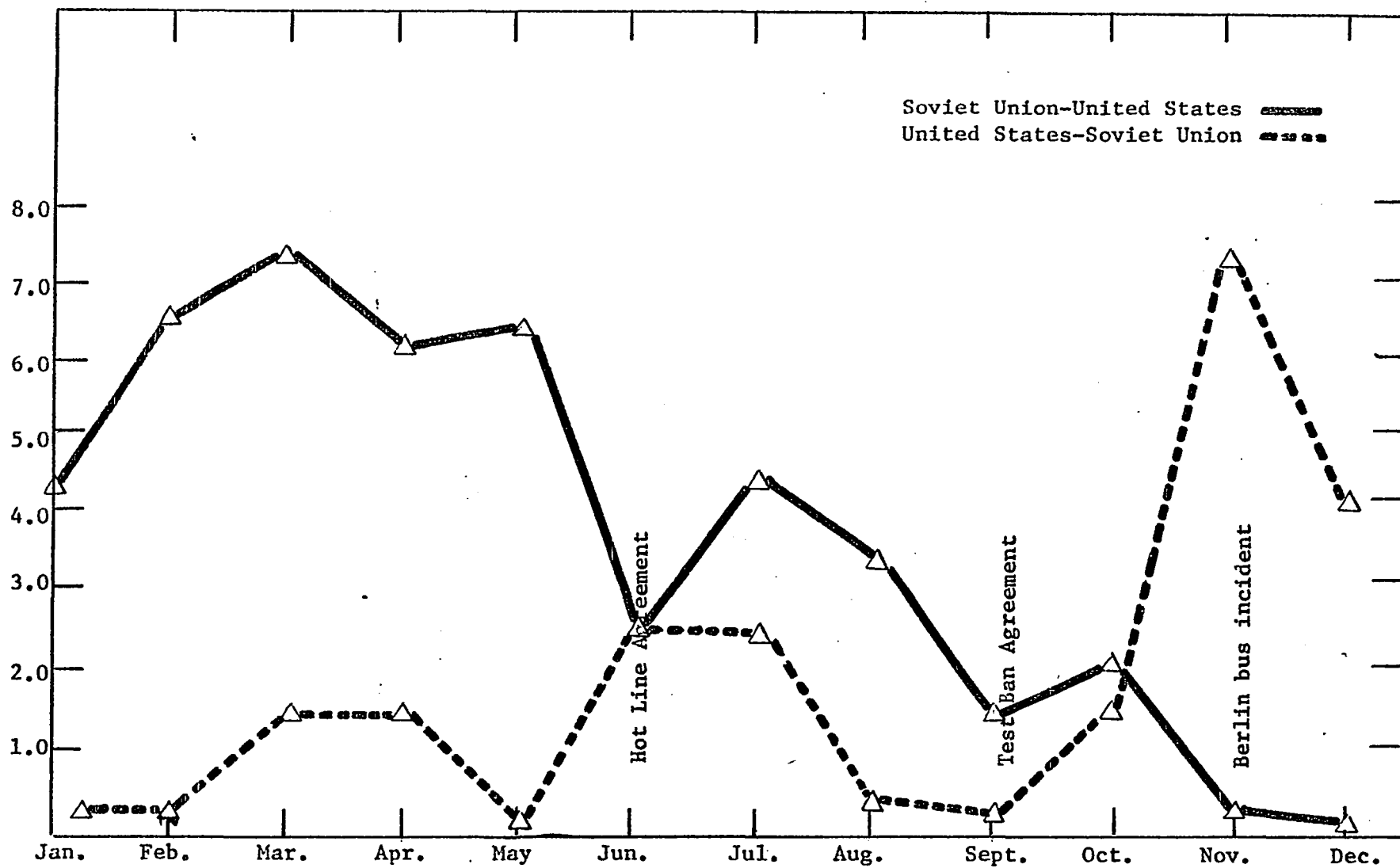


FIGURE XXII - SOVIET UNION-UNITED STATES CONFLICT BEHAVIOR

observations (267 dyads x 12 months).

The Sino-Indian conflict activity most likely represents the tapering off of hostilities following the October 1962 border clashes.

Smoker (1964) analyzed the quantities of diplomatic notes sent between the two nations and found that the quarterly quantities averaged 25 per quarter in 1961 and early 1962. They jumped to 120 in the July to September quarter of 1962. After that, the amounts fell off quarterly to a low of 50 notes exchanged in the final quarter of 1963. Extrapolating from the Smoker study, 1964 behavior between these two nations should drop off even more and the plot shown here should begin to fluctuate less sharply.

The Sino-Soviet conflict behavior seems to underscore China's growing dissatisfaction with the Soviet reluctance to engage in military conflict with the West. The major peak in the profile identifies the disagreement following the July conference between the two which was broken off by Soviet denunciation of the Chinese position and by Soviet agreements to a nuclear test ban. In September, both nations published letters condemning each other.

Figure 22 shows the Soviet Union-United States behavior along the negative communications factor. The Soviets early high in negative communication scores dealt mostly with warnings that the Cuban pull-out should not be construed as cowardly behavior. The large United States response in November follows difficulties over access to Berlin in late October. The Soviet conflict with China and the United States conflict with the Soviet Union seem to be of equal importance in this group. This is supportive of growing anticipation of a future Sino-Soviet

confrontation. Figures 23 and 24 show the dyads for the Soviet's negative communication towards both the United States and China and China's communications towards the United States and Russia, respectively. The behavior patterns are obviously related but there are some interesting differences, especially in the magnitude of the scores. I have calculated a mean score for each of these dyads from their 12 monthly pattern scores on negative communication. They are as follows:

Soviet Union - China	2.0
Soviet Union - United States	3.5
China - Soviet Union	3.5
China - United States	3.2

The intensity of Chinese mean scores towards both her opponents is very close with the average communication score towards the Soviet Union slightly higher. For the Soviets, however, the mean score of negative communication towards the United States is quite a bit higher than the negative communication score to China. It seems likely that the Soviets will either increase their conflict behavior with the Chinese or the Chinese will decrease their activity towards the Soviets, thereby balancing the relationships. The literature would lead one to expect that the Soviets will have increased their negative communication towards the Chinese.

Dyads with loadings above .5 in this group identify a cold war relationship with the inclusion of the Sino-Soviet rift in this classification. But, many of the dyads with loadings between .30 and .50 are not connected to cold war relationships. For instance, India and Pakistan, Great Britain and France, China and India, and South Vietnam and the United States dyads all show these types of loadings on this

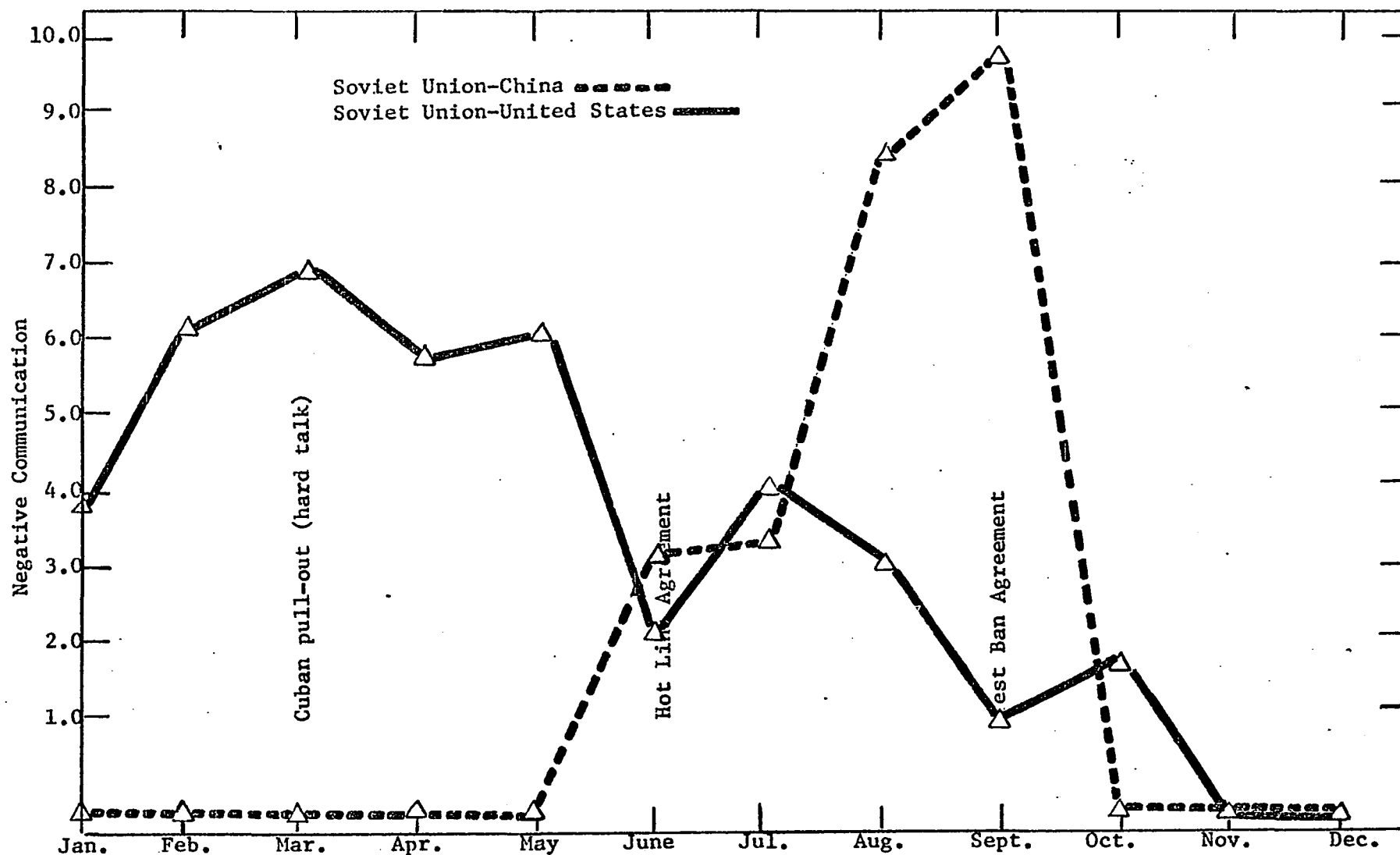


FIGURE XXIII - SOVIET UNION CONFLICT ACTIVITY TO THE UNITED STATES AND CHINA

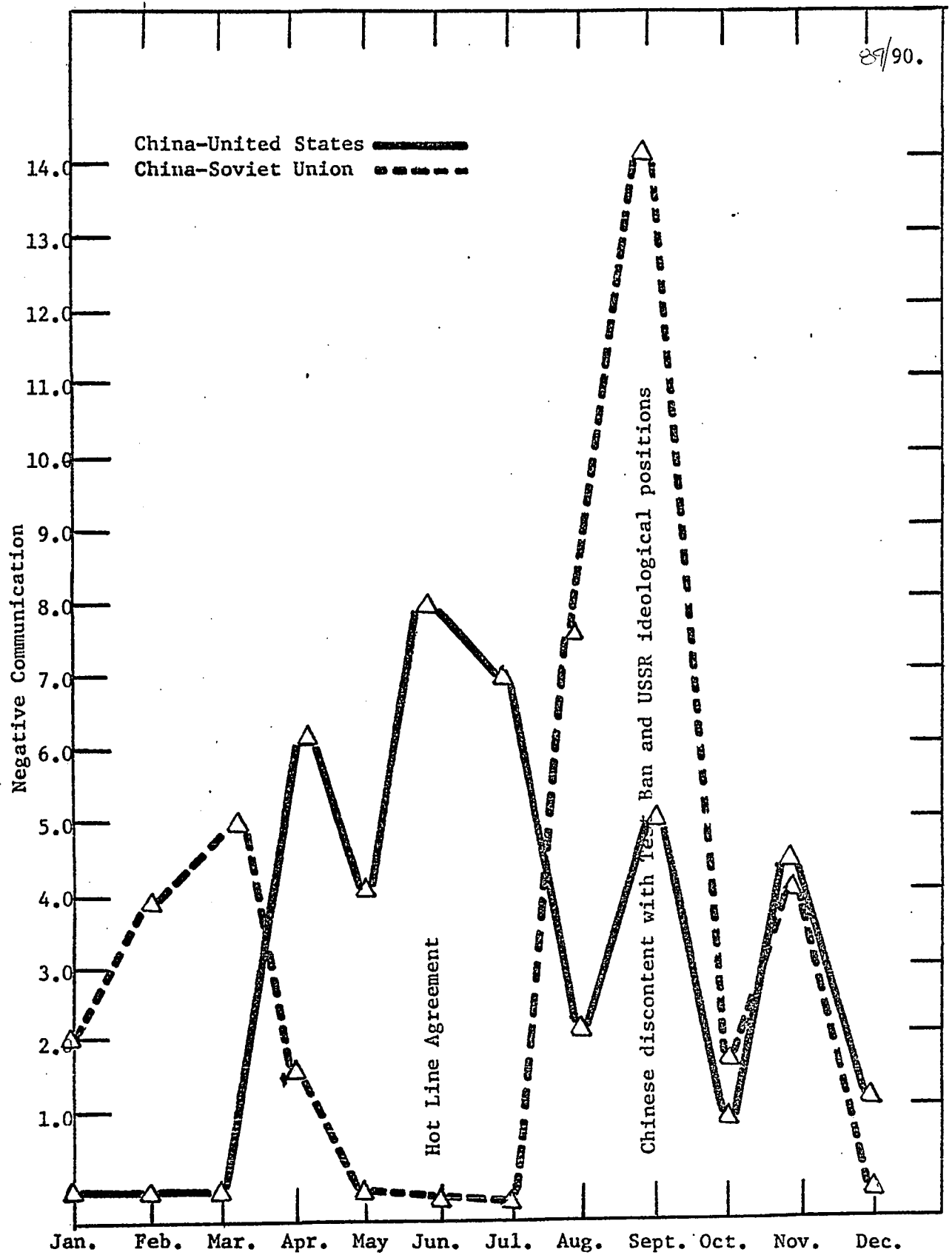


FIGURE XXIV - CHINESE CONFLICT ACTIVITY TO THE UNITED STATES AND SOVIET UNION

factor. The type of conflict behavior which identifies cold war activity is not unrelated to the forms of behavior that characterize several other conflicts. Thus, indicators which underscore the novelty of the cold war must be found in other areas of description than those which designate patterns of conflict behavior.

The third group is delineated by negative sanctions but only at one point in time. This group principally describes the joint Latin American decision to suspend diplomatic relations with Cuba. The group was limited to only dyads with loadings of .50 or above. This was necessary because all nations that loaded on the first group factor also loaded on this factor above the .3 level. With the exception of the one point in time where the negative sanction was jointly imposed against Cuba, the profile of the mean for this group remained very close to that of the population.

Group 4 accounts for official instances of violence. The central dyads are Albania to Yugoslavia and Yugoslavia to Albania. There were border clashes almost weekly between Albania and Yugoslavia in 1963. The other dyads loading highly on this factor were Israeli-Arab dyads and North Korea to the United States. Figures 25 and 26 plot the behavior between Jordan and Israel and Syria and Israel, respectively for official acts of violence.

Ever since George Orwell's 1984 students of international relations have considered the possibility that military conflict will become routine between some nations. McClelland (1968) suggests this from his studies of crisis behavior. Boulding (1962) also suggests the possibility that military conflict is not destabilizing in certain

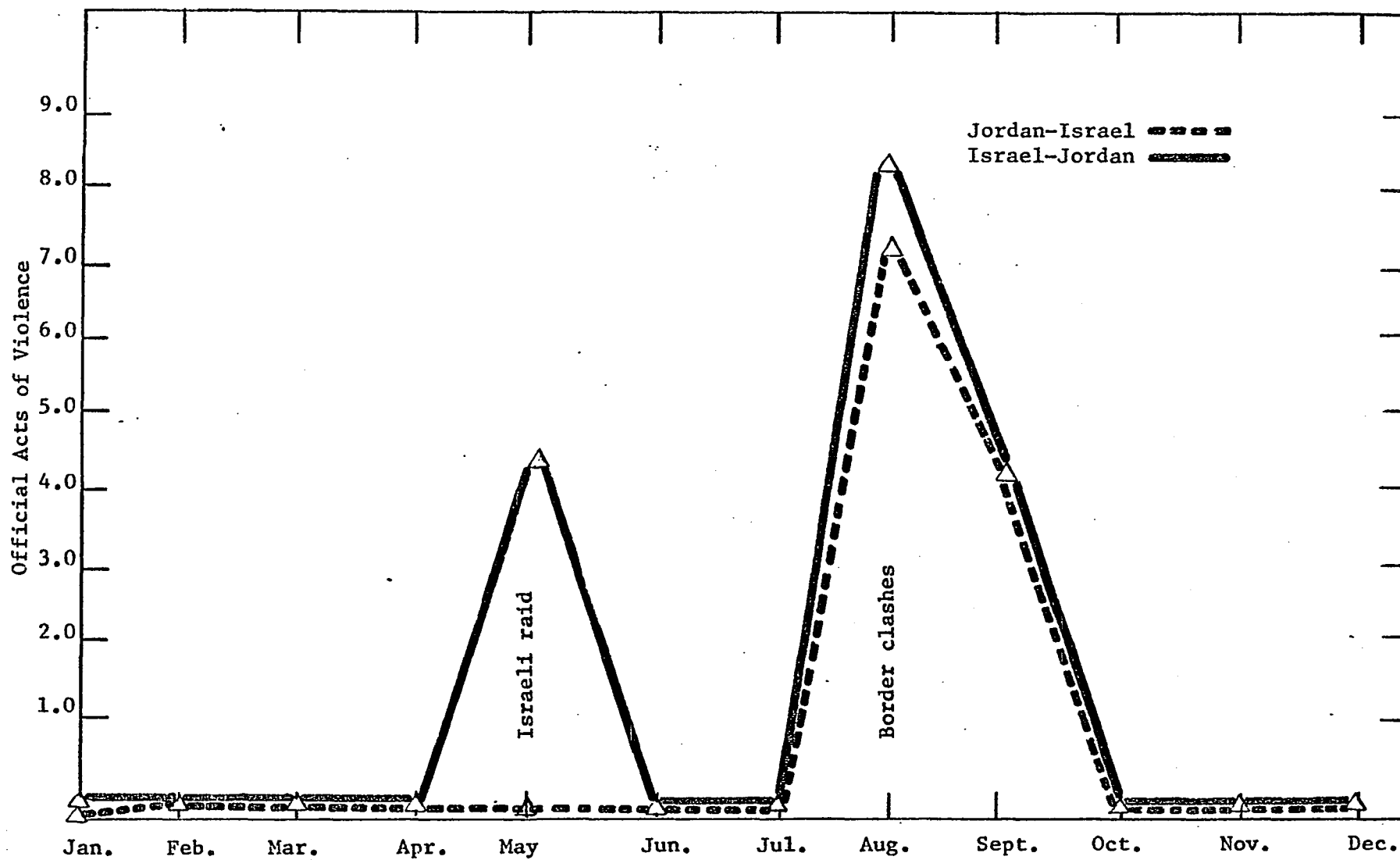


FIGURE XXV - JORDAN-ISRAEL CONFLICT BEHAVIOR

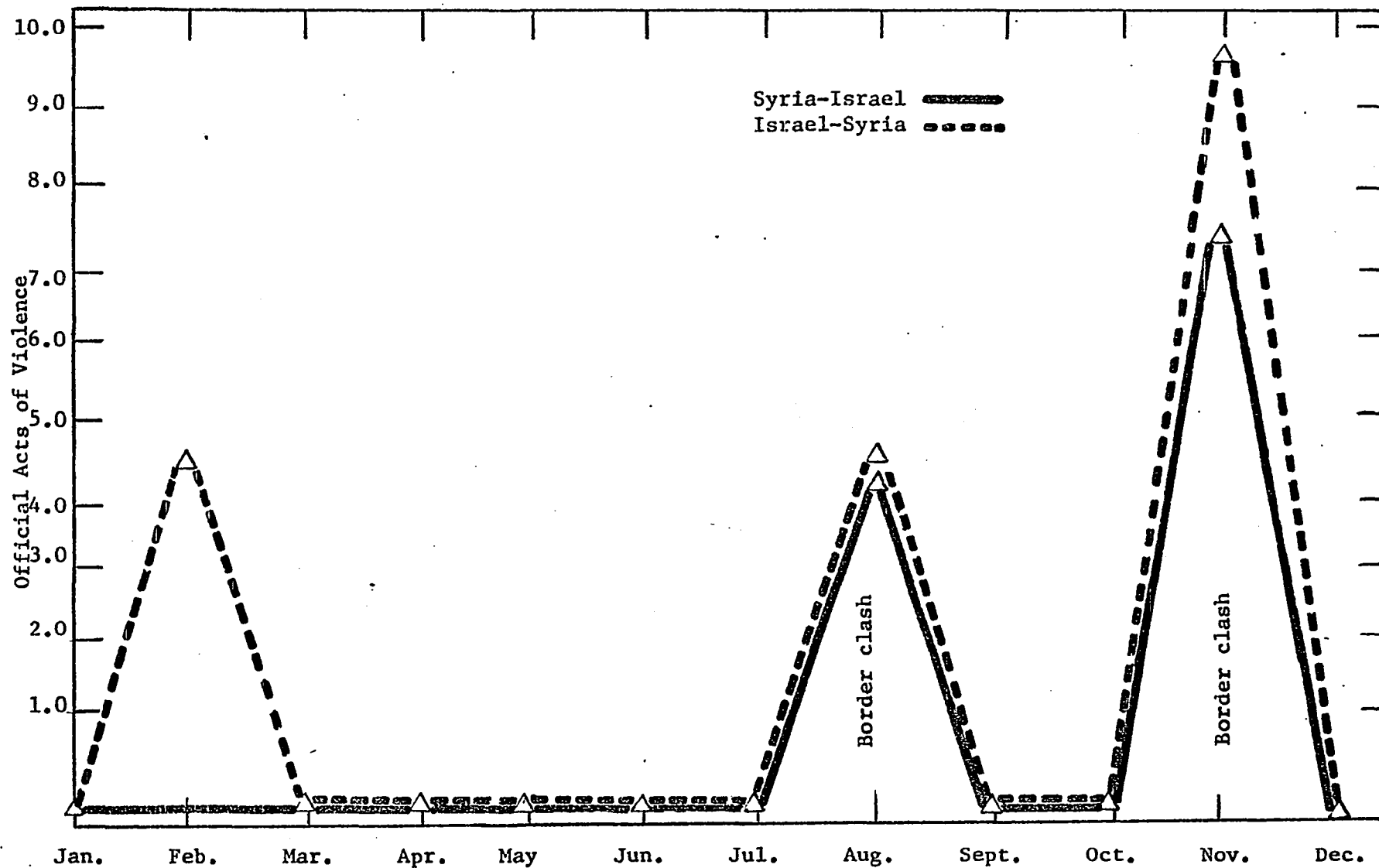


FIGURE XXVI - SYRIA-ISRAEL CONFLICT BEHAVIOR

relationships, but is, indeed, a stabilizing action. There appeared in this study a group of dyads which exhibited rather routine incidents of official violence. Figure 27 plots the mean score on the official acts of violence dimension for the eight dyads that make up Group 4. While there was a peak in magnitude during August when all dyads in the group exhibited conflict, the patterns remained rather consistently high in all periods. The dyads did not exhibit other forms of conflict behavior of any patterned nature, either. For this group of dyads, non-military activity may be more significant than military activity, as was the finding for the Nationalist and Mainland Chinese in the McClelland et al., study (1965).

This routinization of behavior is also common in Group 2. Figure 28 shows the mean scores of negative communications in each month for the dyads in Group 2. This group maintains scores about one standard deviation above the average score for all 184 dyads. The routine nature of the behavior displayed by these two groups (Groups 2 and 4) suggests that 1964 behavior of these groups will remain rather constant. Routine official acts of violence are expected to be a characteristic of a behavior group of dyads. In addition, we can expect to observe a group which exhibits active hostile communications.

Turning to the fifth group, the dyads designated here seem to be mostly less developed nations which exhibited sporadic acts of negative sanctions and warnings and defensive acts. The group probably does not represent patterned behavior that is interpretable or predictable.

Crisis behavior appears quite separate from other forms of conflict behavior. Charles McClelland et al. (1965), in their study of the off

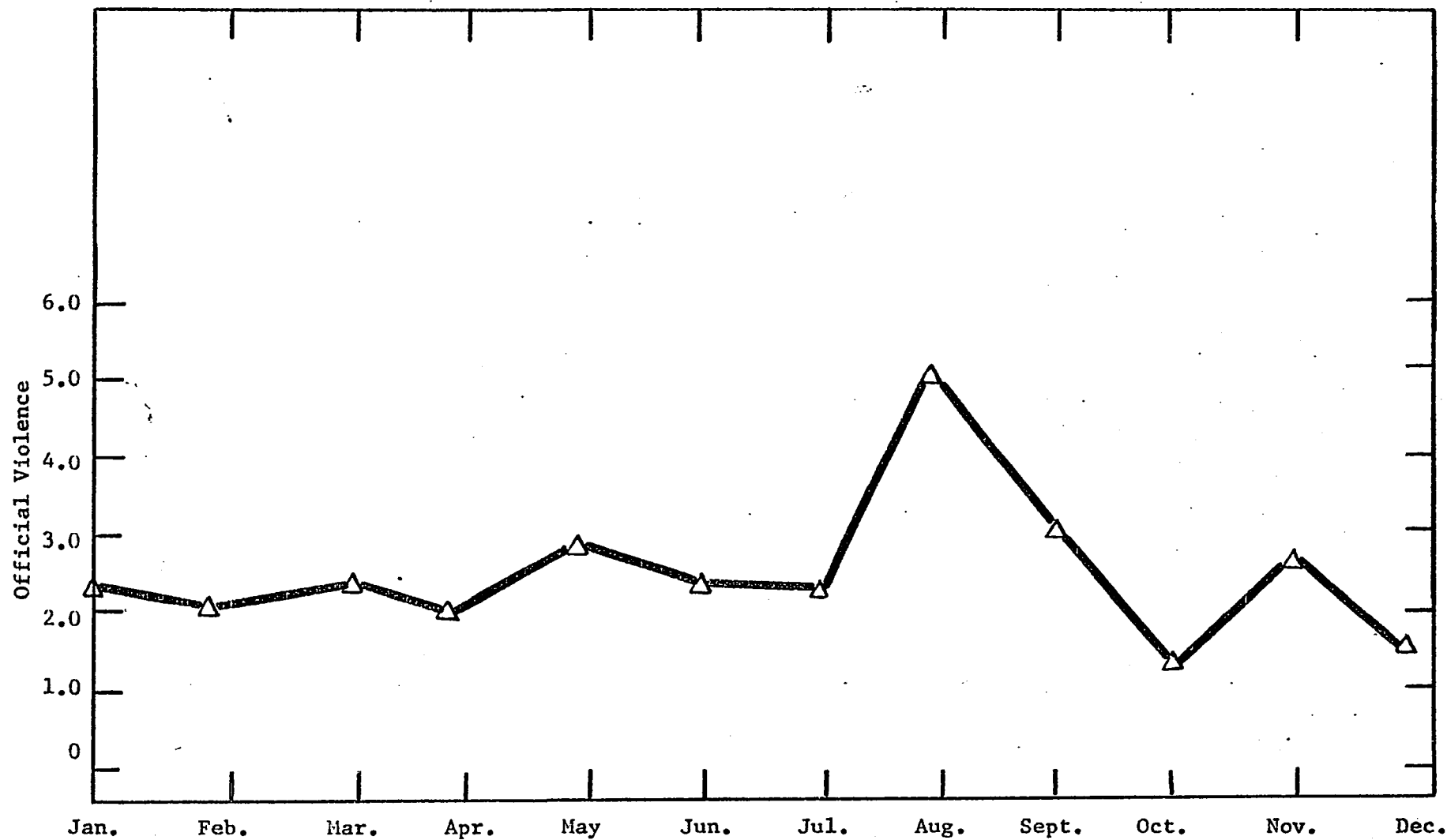


FIGURE XXVII - MONTHLY AVERAGES FOR GROUP 4

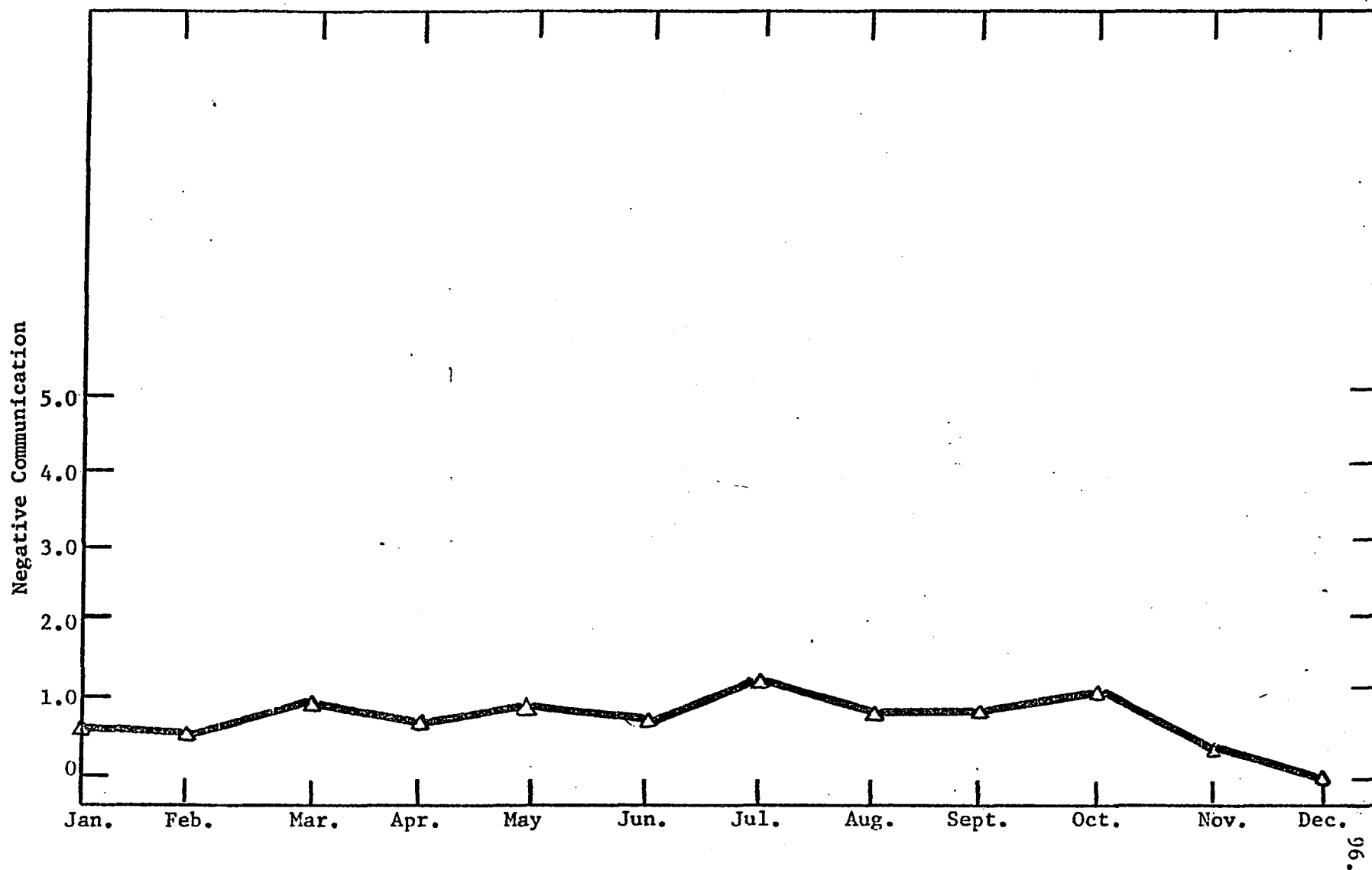


FIGURE XXVIII - MONTHLY AVERAGES FOR GROUP 2

shore islands dispute in the Taiwan Straits found that during periods of crisis, antagonists exhibited increased conflict behavior of several forms. Their finding is reconfirmed in this study. The crisis group exhibited increased amounts of conflict on all patterns of conflict behavior.

The sixth group is the crisis group. These four dyads, centering around the Malaysian and Indonesian conflict in 1963, demonstrate a good deal of conflict behavior on most of the conflict factors for part of the time period--two months in this case. Figures 29 to 30 plot the conflict behavior of Malaysia and Indonesia for four months. Care should be taken in interpreting these figures. They do not represent a time progression as the other figures have. This profile of conflict behavior suggests a mixture of many kinds of behavior. It is quite suggestive of the definition of crisis found in the McClelland et al. studies of the Chinese Communists and Nationalist Chinese in the off shore island disputes (1965).

Another difficult group to interpret is Group 7. Like Group 5, it is a mixed body of dyads which exhibited negative sanctions and warnings and defensive acts, but with very little to tie the dyads together. Both Group 5 and Group 7 delineate these types of occasional strong diplomatic confrontations between nations which are short in duration and difficult to anticipate. The reason that there are two groups rather than one is explainable in terms of differences in timing of occurrences of each confrontation.

The last group accounts for only two dyads but is readily interpretable. These two dyads are Iran to the United States and Venezuela to the United States. Both exhibited unofficial acts of violence or

FIGURE XXIX - INDONESIA-MALAYSIA CONFLICT BEHAVIOR

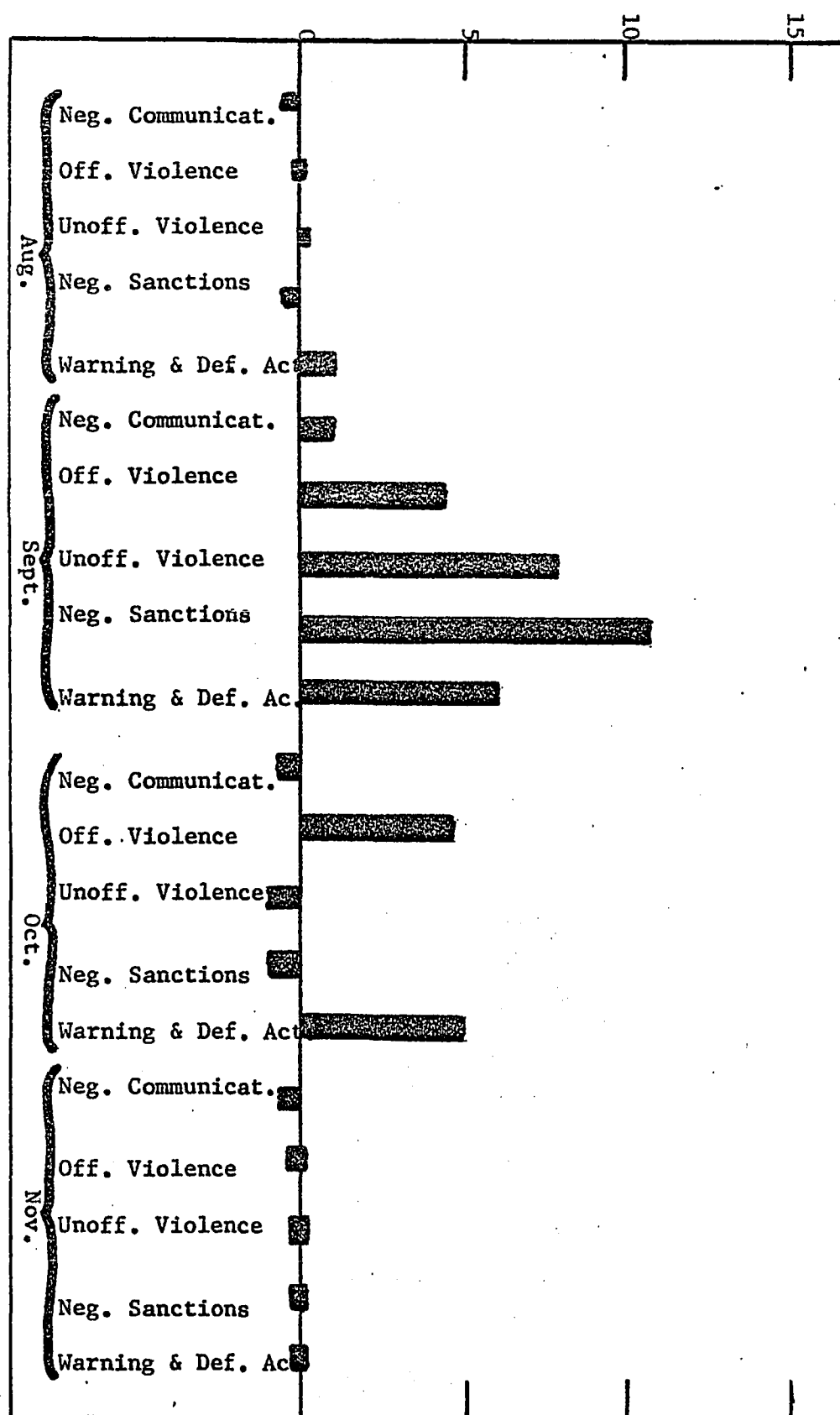
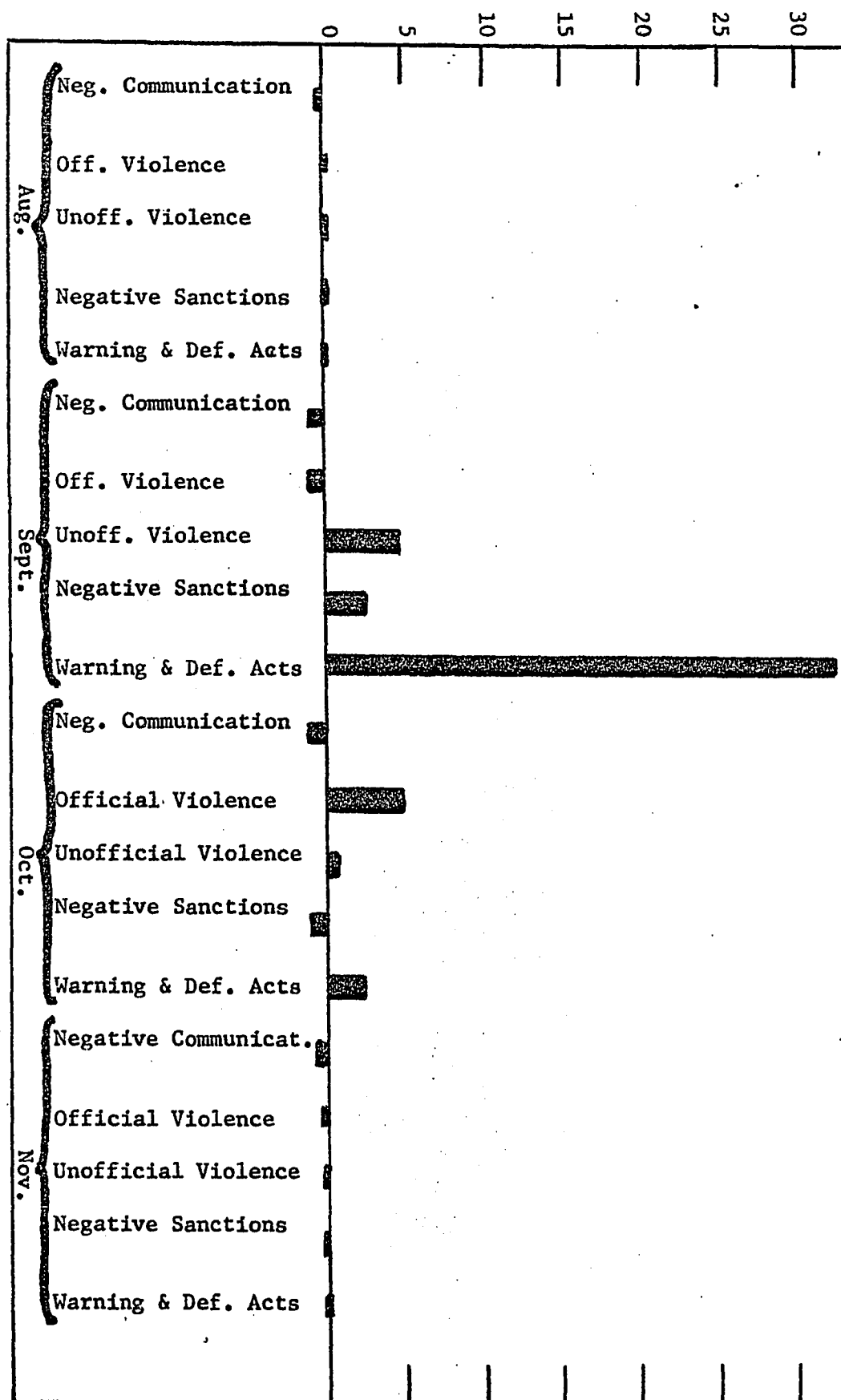


FIGURE XXX - MALAYSIA-INDONESIA CONFLICT BEHAVIOR



protest activity such as rioting against the United States. Certainly most discussions of conflict in the international system today would be incomplete without such a group.

The dyadic members of these over time behavior groups can be compared with the groups found in the Hall and Rummel study (1968). Table XII lists the groupings in their study. Their study grouped only 61 dyads. Since this study is grouping 184 dyads, there is difficulty in going from this study to the earlier study, but it is possible to go from the Hall and Rummel study to the current analysis. The earlier study did not find a general factor. This is to be expected since they had eliminated many more dyads than the current study had in going from the factor scores of the orthogonally rotated conflict dimensions to a distance matrix.

Negative sanctions characterize the dyads belonging to Hall and Rummel's Group 1. Most of these dyads are not in Groups 2 - 8 of this study because they exhibited very little conflict behavior over time. The dyads that do occur in the two studies occur in Groups 5 and 7 of this analysis.

Group 2 in the Hall and Rummel study is explained by high incidence of official violence. It should correspond to the current Group 4 minus the Israeli-Arab dyads. The China-Taiwan conflict was not strong enough in 1963 to be delineated in the over time studies.

Group 3 in the early study corresponds well with Group 2 in the current study. All dyads loading above .5 in this analysis are delineated in Group 3 of the Hall and Rummel work. Warning and defensive acts characterize Group 4 of the Hall and Rummel study and Group 6 in

TABLE XII. DYADIC MEMBERS OF 1963 FOREIGN CONFLICT BEHAVIOR GROUPS*
(Hall & Rummel Study)

GROUP I (20 members)

a

85 Senegal - Portugal
84 USA - Dominican Republic
82 Pakistan - India
82 Cambodia - USA
30 Netherlands - France
78 Belgium - France
77 Morocco - Egypt
76 India - Union of South Africa
76 USA - Cuba
75 Congo (Leopoldville) - Russia
75 United Kingdom - Indonesia
74 Guatemala - United Kingdom
71 USA - Haiti
71 USA - Russia
71 Venezuela - Haiti
70 Haiti - USA
69 USA - South Vietnam
65 United Kingdom - Somalia
64 India - Pakistan
60 France - Russia

GROUP V (7 members)

79 Venezuela - USA
76 Indonesia - United Kingdom
75 Columbia - USA
68 Venezuela - United Kingdom
63 Iran - USA
63 Ecuador - USA
56 Taiwan - Japan

GROUP II (4 members)

89 Yugoslavia - Albania
88 Albania - Yugoslavia
77 China - Taiwan
74 Taiwan - China

GROUP III (6 members)

87 Russia - USA
84 China - USA
79 China - Russia
76 India - China
76 Cuba - USA
61 Russia - China

GROUP IV (4 members)

84 Malaysia - Indonesia
83 Dominican Republic - Haiti
66 Indonesia - Malaysia
60 France - Brazil

GROUP VI (20 members)

75 United Kingdom - Yemen
75 South Vietnam - Cambodia
73 Israel - Jordan
72 Egypt - Saudi Arabia
72 Syria - Israel
70 Japan - USA
69 North Korea - USA
69 Israel - Syria
68 Brazil - France
66 Egypt - Israel
64 Jordan - Israel
62 Iraq - Israel
60 South Vietnam - USA
60 Bulgaria - USA
59 Ethiopia - Somalia
59 Somalia - United Kingdom
58 Malaysia - Philippines
57 United Kingdom - Russia
55 Yemen - United Kingdom
50 Lebanon - Syria

a - loadings rounded off and x 100.

*Behavior for grouping is from the first nation toward the second. Factor analysis (principle axis, varimax rotation) of similarities matrix for 61 dyads. Member loading indicates degree to which member approximates group modal behavior.

this analysis. Hall and Rummel's Group 5 explains incidents of unofficial violence such as rioting. This group is reduced to only the two dyads of Group 8 here.

The only significant characteristic of their Group 6 is the extremely low incidents of negative sanctions among the members. This group does not appear in the current study at all and is broken up because most of the Israeli-Arab dyads join with Yugoslavia and Albania. In general, it would appear that the groupings explaining cold war activity, continuous military encounters, crises, and third world discontent with developed nations (unofficial incidents of violence) are relatively consistent in both across time and over time analyses. Sporadic conflictual behaviors tend to lack consistency in delineating groups between these two approaches to analyzing conflict behavior.

CHAPTER VII

POSSIBLE ERRORS OF COMMISSION OR OMISSION

Although the more methodologically sophisticated reader might be able to point out hidden assumptions or deficiencies in the tools of analysis and the substantively oriented factual errors, sources not considered, or data omitted, the researcher is in a unique position to know many possible errors of commission or omission. Indeed, no one is closer to a particular piece of research than the one who has recently completed a specific investigation. Several potential difficulties can be enumerated.

Possible Errors of Commission

Non-theoretical Choice of Measures

The conflict measures employed here were chosen for reasons of practical rather than theoretical concern. It is possible that a formally delineated theory of conflict behavior would require changes in data collection procedures. This researcher is convinced that the substantive literature of conflict behavior does not provide criteria for choosing the theoretically relevant variables. It is hoped that a comprehensive theory of conflict capable of testing is not slow in emanating from this project.

Time Frame

There are two possible errors regarding time: the number of months analyzed and the possibility of using other time frames. Before this form of analysis can proceed to laying out equations which explain patterns of conflict behavior for individual dyads, a longer time frame is desirable. Since this analysis was the first pass at developing

techniques for describing the structure of conflict behavior, the time involved in collecting more data would have been prohibiting. Future work is necessary in data organization, however. Secondly, while monthly periods seem reliable when compared with other potential time frames, with the collection of more data, continued tests of the legitimacy of monthly periods seems called for. In addition, were other sources of data able to contribute significantly more information, it might be possible to shorten the time frame. This shortening of the time frame from a month to perhaps a week would be desirable given the initial goals of the project.

Correlational Coefficient

The product moment correlation coefficient was chosen over several other possible coefficients. While the choice of coefficients is a moot point, possibly, although not likely, other coefficients might have given more invariant results. And, there is the possibility that the researcher may wish to remain in closer contact with the raw data. This is possible by employing cross products rather than standardizing the data and using correlational coefficients.

Reliability Tests

No direct tests of reliability of the definitions were made. Indirectly, however, their reliability was indicated by the generally high communality of the measures in the factor analysis. If the definitions were unreliable, then considerable random area would contaminate the data, lowering the relationship with data from other studies and also reducing the amount of common variance associated with other measures included in the factor analysis. The communality of random error

variable included in the analysis ought to belie undue concern on this point, however.

Measures of Error

Three measures of error were used to inspect systematic error. None of these measures, however, completely answers the question on whether or not conflict news was eliminated from the New York Times because of important domestic concerns. The fact that all three error variables were highly intercorrelated suggests that they all measure the same dimension of error. Other dimensions of systematic error may exist and may have contaminated the results without my knowing it. Only repetition can lesson the probability of this having occurred.

Possible Errors of Omission

Lack of Cooperation Measures

Conceptually, conflict is generally considered as being on the opposite end of a continuum from cooperation. Intuitively, one would anticipate that most conflicts include a series of proposals, counter proposals, and other feints toward cooperation as part of the strategy of both opponents. Eventually, data on cooperative behavior will have to be collected to see whether cooperation is completely independent of conflict or whether certain forms of cooperation are, indeed, part of the dimensions of conflict delineated in this study. It was decided that until the structure of conflict behavior was delineated for over time analysis and compared with conflict analysis of a cross sectional nature, it would be premeature to include cooperative measures.

Alternative Grouping Techniques

Direct factor analysis of the euclidian distance matrix was employed

in delineating groups. There is another procedure for identifying groups, however. Procedures are available for hierarchially decomposing such a distance matrix into groups (Johnson, 1967). This method has been compared with the direct factor analysis shown here (Phillips, 1968) and found slightly less relevant in delineating groups in international relations. The principal reason for not employing such techniques here is more practical, however. It is currently impossible to consider a matrix of over 100 observations and remodeling the technique for larger numbers of observations is unfeasible.

CHAPTER VIII

DISCUSSION

Throughout this report, emphasis has been placed upon the necessity of developing analytical systems. Early chapters discussed widely employed methods for organizing axioms and suggested that while descriptive studies are beneficial to the overall development of international relations, description must be viewed as an intermediate step in the development of theory. Care was taken as early as Chapter I to show that this study was based upon an abstractive approach to delineating relationships and to factor analysis for discovering patterns. In this chapter I will attempt to make use of some of the findings from Chapters V and VI in order to suggest a prolegema to a theory of conflict behavior, or more generally, a theory of behavior.

The rules of correspondence which set down the relationships between data and theory and the undefined primitive terms which make up part of an axiomatic system that are to be employed in a theory of conflict behavior can be stated:

1. International relations is a system consisting of nations and their complex inter-relationships.
2. The complex behavioral inter-relationships between nations can be represented by a behavior space into which interactions are projected as factors.
3. This behavioral space is spanned by dimensions which generate the space and which are finite and empirically determined.
4. Nations are coupled into dyads in this space.

5. The direction and velocity of movement over time of a dyad in this behavior space is along the dimensions which span this space.

The first four of these rules of correspondence are almost identical to the statements made in field theory, Rummel (1965, pp. 198-202). As the early chapters of this dissertation have undoubtedly made clear, the relationships between concept formation and data aggregation are quite similar in my approach and Rummel's. The crucial theoretical relationships between variables are quite different, however. This point will become clearer in this chapter.

Perhaps, the most significant finding of this research is the similarity in the factor loading matrices of this study and of the Hall and Rummel cross sectional analysis. As previously pointed out, the implications of this similarity are that the parameters which identify patterns of conflict behavior over time do not change when the length of a time slice is varied. This should enable the calculation of pattern scores employing either of the two factor loading matrices mentioned above.

Previously, it has also been suggested that these patterns of conflict behavior for each dyad could be studied using time series methodologies. The time trends derived in this analysis can be approximated by fitting a curve to the patterns, and thus, estimating a function for each dyad's behavior over time on each of the behavioral patterns or dimensions. These patterns of conflict behavior are assumed to contain three aspects of cyclic behavior:

1. Long range trends.
2. Fluctuations around the mean.
3. Changes in the intensity of fluctuation.

As shown in Figure 15 on page 69, the mean scores of several of the dyads in this study exhibited a trend of increased conflict along the unofficial acts of violence pattern. It is very possible that dyads could exhibit trend increases on this dimension and show trend decreases along other dimensions. The trend on some dimensions may even remain constant as it would appear the trend of negative communication as shown in Figure 28 on page 96 seems to do.

The second assumed variation in conflict behavior is a series of fluctuations about these trends. The mean score for negative communication showed a specific cyclic pattern in Figure 12. It was discussed on page 44. This pattern exemplifies the kind of fluctuation that would be expected of specific dyads. Much of the seemingly erratic fluctuations found in this analysis may well be simple fluctuations around trends which do not appear when only 12 months are analyzed.

A third form of variation that can be expected is a change in the amplitude or intensity of the fluctuations themselves. Thus, fluctuations may sometimes be violent and at other times mild. Figures 29 and 30 which show the crisis behavior of Indonesia and Malaysia point to erratic and rapidly changing levels of fluctuations during crisis periods on several dimensions.

Since it is expected that dyads exhibit several patterns of behavior, each fluctuating around its own trend line and its own frequency, high conflict periods may be the result of co-occurrences

in the peaks for each of the conflict patterns. Figure 27 on page 95 plots the group mean scores for official acts of violence of Group 4. This group mean reached a peak in August. The other months all have about the same mean score. August was the month in which Yugoslavian-Albanian, Jordian-Israeli and Syrian-Israeli dyads all exhibited high levels of military conflict. The peaks for all three conflict patterns occurred at the same time. This co-occurrence which must occasionally happen, may be a period of severe stress in the international system.

The discussion in the last several paragraphs points out that the conflict behavior of one nation towards another is considered as a function of the trends and fluctuations of its past behavior towards the same object nation. These periodicities can be delineated for each of the patterns of conflict behavior as is suggested in the fifth axiomatic statement.¹ At this stage, all five patterns can be coordinated in predicting the future behavior of a dyad on any one pattern. Since the parameters or dimensions of conflict behavior space are identified for all dyads, the five patterns for a specific dyad may well be interrelated. It seems desirable to use the information gained from each of these pattern's past behavior in order to predict future behavior of that dyad on a specific parameter. The hypothesized relationship is stated by the following equation:

$$\vec{W}_{ij}(tm) = \sum_{j=1}^p a_{ij} f(\vec{t}_j)_{ij}$$

¹The direction and velocity of movement over time of a dyad in this behavior space is along the dimensions which span this space.

where:

- $\vec{W}_{ij}(tm)$ = The behavior of dyad i on dimension j at time (t_m) ,
- α_{ij} = the coefficient which shows the importance of each dimension j in predicting the future behavior of dyad i ,
- $f(t_\ell)$ = the value from the functions of time used to fit curves to the patterned behavior of dyad i on each of the dimensions j of conflict behavior. The function is assumed to be periodic.

This equation hypothesizes that the five patterns vary in their importance for predicting the future behavior of a dyad on a specific pattern. There is a time lag built into this relationship. The behavioral pattern being predicted will have a cyclic period of a specific time length. The length of this period or complete cycle will determine the time lag in each case. Thus, the specification of time can vary from pattern to pattern as well as dyad to dyad.

Other findings from this study tend to complicate the basic equation. The groups which define similar patterns of conflict behavior for negative communication, official acts of violence and crisis behavior, all demonstrate reciprocity in behavior or symmetrical conflict relationships. Another way of interpreting these groups would be that the dyads which load similarly on a dimension tend to show co-variation. Thus, in many instances what one nation does to another can be expected to be returned. This suggests a complication of the basic equation to account for opponent's influences on a conflict pattern. The equation then becomes:

$$\vec{W}_{ij}(tm) = \sum_{j=1}^p \alpha_{ij} f(t_\ell)_{ij} + \sum_{j=1}^p \alpha_{qj} f(t_\ell)_{qj}$$

where:

$$\begin{aligned}
 \vec{W}_{ij}(t_m) &= \text{The behavior of dyad } i \text{ on dimension } j \\
 &\quad \text{at time } (t_m), \\
 \alpha_{ij} &= \text{the coefficient which shows the importance} \\
 &\quad \text{of each dimension } j \text{ in predicting the future} \\
 &\quad \text{behavior of dyad } i, \\
 f(t_k) &= \text{the values from the functions of time used} \\
 &\quad \text{to fit curves to the patterned behavior} \\
 &\quad \text{of dyad } i \text{ on each of the dimensions } j \text{ of} \\
 &\quad \text{conflict behavior, and} \\
 \sum_{j=1}^p \alpha_{qj} \vec{f}(t_k)_{qj} &= \text{are the weights and functions' values for} \\
 &\quad \text{dyad } q \text{ (} q \text{ is dyad } b \text{ to } a \text{ where dyad } i \\
 &\quad \text{is } a \text{ to } b \text{) on dimensions } j.
 \end{aligned}$$

What remains to be done is to test the two basic equations given in this chapter. In order to do that, several preliminary steps must be taken. Data must be organized over a longer time period than that used in this study. It would be preferable if we had at least twice as many points over time as there are parameters in the two basic equations. In addition, the stability of the five patterns identified earlier should be investigated using the regression weights employed in calculating factor scores in this study, factor scores for months in 1964 and 1965 can be estimated and then compared with scores derived in factor analysis of these years separately.

Once the stability of the patterns is determined, the periodicity of the dyads' behavior on each pattern can be calculated. Then, the relevant information will be available for testing this theoretical development.

In essence, this dissertation has laid out the methodological groundwork for delineating the patterns of conflict behavior which vary over both dyads and time. It was found that the scores derived from a

Super P-factor analysis are appropriate for moving to theories of changes in conflict behavior over time. Then, an initial attempt at setting down such a theory was made. The path of future research is clear for this student of international affairs.

APPENDIX I

ALPHABETICAL LISTING OF NATIONS

DIMENSIONALITY OF NATIONS PROJECT

Alphabetical Listing of Nations

<u>I.D.</u>	<u>Political Unit</u>	<u>Code</u> <u>Abbrev.</u>	<u>I.D.</u>	<u>Political Unit</u>	<u>Code</u> <u>Abbrev.</u>
1.	Afghanistan	AFG	33.	Haiti	HAI
2.	Albania	ALB	34.	Honduras	HON
3.	Argentina	ARG	35.	Hungary	HUN
4.	Australia	AUL	36.	India	IND
5.	Austria	AUS	37.	Indonesia	INS
6.	Belgium	BEL	38.	Iran	IRN
7.	Bolivia	BOL	39.	Iraq	IRQ
8.	Brazil	BRA	40.	Ireland	IRE
9.	Bulgaria	BUL	41.	Israel	ISR
10.	Burma	BUR	42.	Italy	ITA
11.	Cambodia	CAM	92.	Ivory Coast	IVO
83.	Cameroon	CAO	43.	Japan	JAP
12.	Canada	CAN	44.	Jordan	JOR
84.	Central African Rep.	CEN	45.	Korea (Dem. Rep.)	KON
13.	Ceylon	CEY	46.	Korea (Rep. of)	KOS
85.	Chad	CHA	80.	Laos	LAO
14.	Chile	CHL	47.	Lebanon	LEB
15.	China	CHN	48.	Liberia	LBR
16.	China (Rep. of)	CHT	49.	Libya	LBY
17.	Colombia	COL	93.	Madagascar	MAD
87.	Congo (Brazzaville)	CON	94.	Malaysia	MAL
86.	Congo (Leopoldville)	COP	95.	Mali	MLI
18.	Costa Rica	COS	96.	Mauritania	MAT
19.	Cuba	CUB	50.	Mexico	MEX
20.	Czechoslovakia	CZE	97.	Morocco	MOR
88.	Dahomey	DAH	51.	Nepal	NEP
21.	Denmark	DEN	52.	Netherlands	NTH
22.	Dominican Republic	DOM	53.	New Zealand	NEW
23.	Ecuador	ECU	54.	Nicaragua	NIC
24.	Egypt (UAR)	EGP	98.	Niger	NIR
25.	El Salvador	ELS	99.	Nigeria	NIG
26.	Ethiopia	ETH	55.	Norway	NOR
27.	Finland	FIN	56.	Outer Mongolia	OUT
28.	France	FRN	57.	Pakistan	PAK
89.	Gabon	GAB	58.	Panama	PAN
29.	Germany (D.D.R.)	GME	59.	Paraguay	PAR
30.	Germany (Fed. Rep.)	GMW	60.	Peru	PER
90.	Ghana	GHA	61.	Philippines	PHI
31.	Greece	GRC	62.	Poland	POL
32.	Guatamala	GUA	63.	Portugal	POR
91.	Guinea	GUN	64.	Rumania	RUM

DIMENSIONALITY OF NATIONS PROJECT

Alphabetical Listing of Nations (Continued)

<u>I.D.</u>	<u>Political Unit</u>	<u>Code Abbrev.</u>	<u>I.D.</u>	<u>Political Unit</u>	<u>Code Abbrev.</u>
65.	Saudi Arabia	SAU	71.	Turkey	TUR
100.	Senegal	SEN	72.	Union of S. Africa	UNS
204.	Sierra Leone	SIE	73.	USSR	USR
101.	Somalia	SOM	74.	United Kingdom	UNK
66.	Spain	SPN	75.	USA	USA
102.	Sudan	SUD	105.	Upper Volta	UPP
67.	Sweden	SED	76.	Uruguay	URA
68.	Switzerland	SWZ	77.	Venezuela	VEN
69.	Syria	SYR	81.	Vietnam (N)	VTN
213.	Tanganyika	TAN	82.	Vietnam (S)	VTS
70.	Thailand	TAI	78.	Yemen	YEM
103.	Togo	TOG	79.	Yugoslavia	YUG
104.	Tunisia	TUN			

APPENDIX II

FACTOR ANALYSES OF 3-MONTH PERIODS FOR
DYADIC CONFLICT

TABLE XIV. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a
JANUARY - MARCH 1963

MEASURES	ORTHOGONALLY ROTATED FACTOR MATRIX ^{b,c}					h ²
	F ₁	F ₂	F ₃	F ₄	F ₅	
1 WARND ^d	12	04	-02	(94)	-03	90
2 ALRTMB	10	05	-02	(96)	-03	93
3 PLNVIL	06	(99)	-03	05	00	98
4 WARACT	06	(99)	-03	05	00	99
5 DISCMA	04	(98)	-02	01	-01	97
6 DAYVIL	03	(99)	-02	02	-01	99
7 NEGACT	09	00	00	06	(93)	88
8 UNCNEG	18	01	-05	-08	(63)	44
9 SEVDPR	-10	05	-05	29	35	22
10 EXPREC	-05	-02	14	-03	40	18
11 BCOTEM	01	-03	-07	-03	(61)	38
12 AIDREB	(76)	05	01	24	05	65
13 NEGCOM	(78)	06	01	11	-07	63
14 WRTCOM	(84)	-05	-02	-08	01	72
15 ORLCOM	(78)	11	-03	15	-01	64
16 ACCUSN	(78)	-05	-06	-18	08	65
17 PROTST	(81)	02	02	18	02	69
18 MINTHM	(59)	05	-06	-14	07	38
19 UNOFVL	-01	-02	(96)	-02	00	92
20 ATKEMB	-01	-01	(56)	00	09	33
21 ATKPER	-02	-01	45	00	05	20
22 ATKFLG	01	-01	(63)	-03	-08	40
23 NVIOLB	-04	-02	37	-01	-04	14
% Common Variance	29.7	27.9	14.1	14.6	13.8	
% Total Variance	18.3	17.2	8.7	9.0	8.5	

^aDecimals omitted from loadings.

^bParentheses indicate loadings ≥ 50 .

^cPrincipal component model from product moment correlation coefficients, principal axes technique rotated to orthogonal solution by varimax technique.

^dKey to codes given in Table I, p. 28 of text.

TABLE XV. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a
APRIL - JUNE 1963

MEASURES	ORTHOGONALLY ROTATED FACTOR MATRIX ^{b,c}					h ²
	F ₁	F ₂	F ₃	F ₄	F ₅	
1 WARND ^d	11	05	-06	03	(95)	92
2 ALRTMB	11	05	-05	04	(95)	92
3 PLNVIL	-00	(87)	-02	-03	-03	77
4 WARACT	-00	(86)	-02	-03	-03	75
5 DISCMA	03	(88)	-01	03	04	78
6 DAYVIL	03	(84)	-01	03	04	71
7 NEGACT	05	-01	03	96	02	93
8 UNCNEG	18	08	03	(56)	-05	35
9 SEVDPR	-14	02	-09	(52)	18	33
10 EXPREC	-03	-06	13	37	-04	16
11 BCOTEM	05	-04	-02	(51)	07	27
12 AIDREB	03	-01	-05	30	01	10
13 NEGCOM	(82)	-03	-00	08	11	69
14 WRICOM	(84)	-05	00	05	-09	72
15 ORLCOM	(78)	08	-01	07	01	62
16 ACCUSN	(62)	-01	-03	-09	05	40
17 PROTST	(71)	-00	-05	17	01	53
18 MINTHM	(70)	08	-02	-02	28	58
19 UNOFVL	-02	-01	(97)	-02	16	97
20 ATKEMB	04	-06	19	-05	48	27
21 ATKPER	-03	-02	(69)	-04	-01	48
22 ATKFLG	-02	03	(84)	02	-01	71
23 NVIOLB	-02	-05	09	-12	01	03
% Common Variance	26.6	23.4	17.0	16.0	17.0	
% Total Variance	15.0	13.2	9.6	9.0	9.6	

^aDecimals omitted from loadings.

^cSee footnote c, Table XIV.

^bParentheses indicate loadings $\geq .50$.

^dSee footnote d, Table XIV.

TABLE XVI. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a
JULY - SEPTEMBER 1963

MEASURES	ORTHOGONALLY ROTATED FACTOR MATRIX ^{b,c}					h ²
	F ₁	F ₂	F ₃	F ₄	F ₅	
1 WARND ^d	04	17	05	-01	(95)	94
2 ALRTMB	02	17	04	-03	(94)	92
3 PLNVIL	(99)	-01	-01	-06	00	98
4 WARACT	(97)	-01	-00	-06	01	95
5 DISCMA	(98)	01	-00	-07	02	97
6 DAYVIL	(98)	01	-00	-07	03	96
7 NEGACT	07	02	-02	(96)	11	94
8 UNCNEG	02	07	13	(62)	00	40
9 SEVDPR	01	-22	-10	50	33	41
10 EXPREC	-05	02	-02	35	-12	14
11 BCOTEM	-03	01	-05	45	-07	21
12 AIDREB	31	08	-06	19	-01	15
13 NEGCOM	02	(90)	-04	-05	13	84
14 WRTCOM	-04	(74)	-02	00	-12	56
15 ORLCOM	05	(67)	-04	-09	12	48
16 ACCUSN	07	(84)	-03	02	03	72
17 PROTST	-02	69	-02	23	-12	54
18 MINTHM	03	(70)	00	-01	23	55
19 UNOFVL	-00	-04	(94)	-03	12	88
20 ATKEMB	-01	03	42	01	25	24
21 ATKPER	-03	-06	(71)	-01	-05	51
22 ATKFLG	-02	-03	(85)	-00	-10	73
23 NVIOLB	-03	-09	13	-07	15	05
% Common Variance	28.2	25.7	16.5	14.2	15.4	
% Total Variance	17.2	15.7	10.1	8.7	9.4	

^aDecimals omitted from loadings.

^cSee footnote c, Table XIV.

^bParentheses indicate loadings $\geq$.50.

^dSee footnote d, Table XIV.

TABLE XVII. FACTOR ANALYSIS OF DYADIC CONFLICT MEASURES^a
OCTOBER - DECEMBER 1963

MEASURES	ORTHOGONALLY ROTATED FACTOR MATRIX ^{b,c}					h ²
	F ₁	F ₂	F ₃	F ₄	F ₅	
1 WARNDF ^d	14	23	07	04	(-91)	
2 ALRTMB	08	23	06	03	(-90)	(88)
3 PLNVIL	(97)	05	02	-03	-10	(95)
4 WARACT	(95)	06	03	-02	-13	(93)
5 DISCMA	(97)	04	01	-04	-08	(94)
6 DAYVIL	(92)	01	00	-05	-04	(86)
7 NEGACT	00	-02	-05	(96)	-16	(94)
8 UNCNEG	-01	03	06	(66)	-12	46
9 SEVDPR	01	-28	-13	33	-36	34
10 EXPREC	-08	04	-01	42	15	21
11 BCOTEM	-05	-01	-04	38	07	15
12 AIDREB	15	04	08	21	04	08
13 NEGCOM	05	(89)	-06	-04	-16	(83)
14 WRFCOM	-02	(71)	-01	09	17	(55)
15 ORLCOM	-01	(64)	-09	-14	-16	46
16 ACCUSN	11	(68)	-05	01	-03	48
17 PROTST	-04	(71)	00	27	20	(62)
18 MINTHM	10	(64)	-01	01	-33	(53)
19 UNOFVL	06	-05	(90)	-09	-21	(88)
20 ATKEMB	02	-03	48	-08	-23	29
21 ATKPER	-02	-06	(84)	-03	07	(71)
22 ATKFLG	-02	-04	(80)	02	13	(66)
23 NVIOLE	06	-09	09	-15	-38	19
% Common Variance	27.0	23.8	17.8	14.3	17.0	
% Total Variance	16.2	14.3	10.7	8.6	10.2	

^aDecimals omitted from loadings.

^cSee footnote c, Table XIV.

^bParentheses indicate loadings $\geq$ 50.

^dSee footnote d, Table XIV.

APPENDIX III

CANONICAL COMPARISONS OF MONTHLY AND 3-MONTH
PERIOD FACTOR STRUCTURE

TABLE XVIII. CANONICAL VARIATES FOR COMPARISON BETWEEN
JANUARY - MARCH FACTORS AND SUPER-P FACTORS

Canonical Coefficients	Canonical Variates					
	1 ^a	2	3	4	5	
1. Negative Communications	-.11	.05	-.49	.11	.47	Current Study
2. Official Incidents of Violence	(-.86)	-.44	.29	-.03	.34	
3. Unofficial Acts of Violence	.12	-.09	(.53)	(.67)	.35	
4. Negative Sanctions	.35	(-.76)	-.13	.04	.32	
5. Warning and Defensive Acts	.24	.03	(.51)	(-.61)	.27	
Canonical Correlations	.98	.96	.95	.93	.53	
1. Negative Communications	-.12	-.03	-.43	.28	(.55)	Hall Rummel Study
2. Official Incidents of Violence	(-.86)	(-.51)	.34	.14	.41	
3. Unofficial Acts of Violence	.13	-.17	(.64)	(.77)	(.50)	
4. Negative Sanctions	.33	-.09	(.53)	(-.51)	.34	
5. Warning and Defensive Acts	.36	-.34	-.07	.23	.40	

Trace Correlation = .89

^a Parentheses indicate > 50.

TABLE XIX. CANONICAL VARIATES FOR COMPARISON BETWEEN
APRIL - JUNE FACTORS AND SUPER-P FACTORS

Canonical Coefficients	Canonical Variates					
	1 ^a	2	3	4	5	
1. Negative Communications	.22	-.49	.33	-.30	(.58)	Current Study
2. Official Incidents of Violence	(-.79)	.37	.24	-.15	(.50)	
3. Unofficial Acts of Violence	.44	(.52)	.36	.47	.48	
4. Negative Sanctions	.02	.11	(-.83)	-.00	(.51)	
5. Warning and Defensive Acts	.29	(.56)	.04	(-.89)	.26	
Canonical Correlations	.99	.98	.97	.92	.72	
1. Negative Communications	.23	(-.58)	.37	-.19	(.50)	Hall Rummel Study
2. Official Incidents of Violence	(-.75)	.34	.34	-.11	.47	
3. Unofficial Acts of Violence	.45	.44	.34	(.58)	.46	
4. Negative Sanctions	.07	.09	(-.83)	.04	.48	
5. Warning and Defensive Acts	.41	(.58)	.02	(-.78)	.29	

Trace Correlation = .92

^a Parentheses indicate > .50.

TABLE XX. CANONICAL VARIATES FOR COMPARISON BETWEEN
JULY - SEPTEMBER FACTORS AND SUPER-P FACTORS

Canonical Coefficients	Canonical Variates					
	1 ^a	2	3	4	5	
1. Negative Communications	-.27	(.53)	-.36	.43	(.51)	Current Study
2. Official Incidents of Violence	-.03	(-.72)	.25	.40	.47	
3. Unofficial Acts of Violence	(.63)	-.13	(-.59)	-.19	.43	
4. Negative Sanctions	.19	.38	(.58)	-.37	.47	
5. Warning and Defensive Acts	(.66)	.29	.29	(.80)	.21	
Canonical Correlations	.99	.99	.98	.97	.85	
1. Negative Communications	-.03	(-.71)	.34	.33	(.51)	Hall Rummel Study
2. Official Incidents of Violence	-.30	.49	-.44	.38	(.50)	
3. Unofficial Acts of Violence	(.64)	-.16	(-.64)	-.18	.46	
4. Negative Sanctions	.18	.38	.48	-.45	(.50)	
5. Warning and Defensive Acts	(.68)	.30	.33	(.71)	.20	

Trace Correlation = .96

^a Parentheses indicate > 50.

TABLE XXI. CANONICAL VARIATES FOR COMPARISON BETWEEN
OCTOBER - DECEMBER FACTORS AND SUPER-P FACTORS

Canonical Coefficients	Canonical Variates					
	1 ^a	2	3	4	5	
1. Negative Communications	.16	-.40	-.45	-.47	(.59)	Current Study
2. Official Incidents of Violence	-.01	(-.65)	.76	-.34	.46	
3. Unofficial Acts of Violence	(-.86)	.19	.11	-.26	(.52)	
4. Negative Sanctions	(.50)	.48	.37	-.14	(.57)	
5. Warning and Defensive Acts	.07	.22	.25	(-.89)	.15	
Canonical Correlations	.99	.99	.98	.96	.79	
1. Negative Communications	-.04	(-.69)	(.74)	-.22	.38	Hall Rummel Study
2. Official Incidents of Violence	.05	-.46	(-.50)	-.45	.49	
3. Unofficial Acts of Violence	(-.92)	.16	.09	-.28	(.50)	
4. Negative Sanctions	.38	.41	.35	-.13	(.60)	
5. Warning and Defensive Acts	-.08	-.34	-.25	(.81)	-.07	

Trace Correlation = .95

^a Parentheses indicate >50.

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