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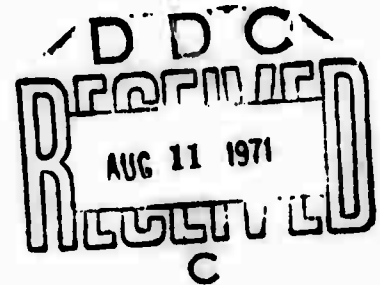
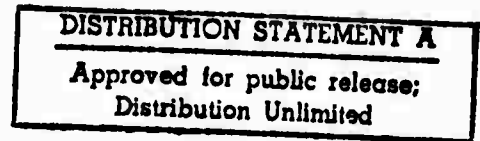
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COMMUNIST CHINA'S FOREIGN BEHAVIOR:  
AN APPLICATION OF FIELD THEORY MODEL II

Sang Woo Rhee

July 1971



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13. ABSTRACT <p><b>This is a study of Communist China's contemporary foreign behavior patterns. The purpose of the research is to explain Communist China's system of foreign relations by examining her differences and similarities with each other nation.</b></p> <p><b>Rummel's field theory guides this study. Applying this theory, a theoretical model of foreign behavior decision-making system was formulated. The research has focused on determining China's idiosyncratic systems of both perceptions of attribute distances and behavioral preferences.</b></p> <p><b>The findings include the following: 1) Linear linkage between the attribute distances of the nations from China and China's behavior toward those nations, which was proposed by field theory, was found to exist within a satisfactory margin of error. 2) China's joint conflict behavior and trading behavior toward other nations is the function of the power distance between China and the object nation. 3) In general, attribute differences between China and other nations explain about fifty-three percent of the variation in China's foreign behavior toward them.</b></p>			

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To

Professor Han-Key Lee

who made me a scholar

and

Professor R. J. Rummel

who made me a political scientist.

COMMUNIST CHINA'S FOREIGN BEHAVIOR:  
AN APPLICATION OF FIELD THEORY MODEL II

By Sang Woo Rhee

A dissertation submitted to the Graduate Division of the University  
of Hawaii in partial fulfillment of the requirements for the  
degree of Doctor of Philosophy

ABSTRACT

This is a study of Communist China's contemporary foreign behavior patterns. The purpose of the research is to explain Communist China's system of foreign relations by examining her differences and similarities with each other nation.

Rummel's field theory, which states that "the behavior of one nation toward another is a linear transformation of their differences from each other on their attributes," guides this study. Applying this theory, a theoretical model of foreign behavior decision-making system was formulated. In the model, the objective attribute distances are related to the final behavior through perceptual framework and behavioral preference systems. First, the decision-makers of China perceive the relative distances of China from all other nations on various attributes through their own filtering system or unique perceptual framework. As a consequence, the same distances may be felt differ-

ently by Chinese decision-makers than by others. Second, when the Chinese decision-makers decide their behavior, the perceived distances are again modified by their idiosyncratic behavioral preference systems before they determine their final decision. Applying this model, the research has focused on determining China's idiosyncratic systems of both perceptions of attribute distances and behavioral preferences.

Data were collected on thirty-five attribute variables which measure the attribute distances of eighty-one nations from China and of seventeen behavioral variables which measured China's behavior *vis-à-vis* those nations for 1955 and 1963. Both matrices of data (attribute and behavioral) were factor-analyzed to get sets of basis dimensions of the two matrix spaces and the scores of the dimensions were used in the analysis.

The findings of the study include the following:

- 1) Linear linkages between the attribute distances of the nations from China and China's behavior toward those nations, which was proposed by field theory, was found to exist within a satisfactory margin of error. This finding strongly supports the validity of field theory.
- 2) China's foreign behavior patterns were delineated in the form of seven canonical structure equations, some of which say that
  - a. China's joint conflict behavior and trading behavior toward other nations is the function of the power distance between China and the object nation;
  - b. China's formal diplomacy is determined by the object's political orientation;

c. China's political penetration was directed to world rural areas--underdeveloped, non-Communist agricultural areas where the Soviet influence is weak.

3) In general, attribute differences between China and other nations explain about fifty-three percent of the variation in China's foreign behavior toward them.

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## CHAPTER I

### INTRODUCTION

China, long a "sleeping lion" of Asia, is now awakening. In the past twenty years, she has been transformed from a semi-colonized prey of the Powers to a formidable giant, with a well-organized population of eight hundred million and the largest army in the world. Although economically, China is still a second-rate power, at best,<sup>1</sup> no one can deny her influential position in the present international political arena.

On April 25, 1970, the *Hsien-hua News Agency* reported that the People's Republic of China had launched her first satellite into orbit on the previous day. The 173 kilogram "Mao's Moon" (so christened by an Italian newspaper) broadcasted the Chinese, semi-official national anthem, "The East is Red" for forty seconds, every five minutes, as it passed over the ninety capitals of the world.<sup>2</sup> The satellite's impact on all nations will be great, not only because it implies China's approaching capability to build and use ICBM's, the formidable symbol

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<sup>1</sup>North, 1969, p. 22.

<sup>2</sup>*The Chosen Ilbo*, April 26, 1970, p. 1 and April 28, 1970, p. 2.

of the super power,<sup>3</sup> but also because it dramatically demonstrates China's technical capability which, without doubt, will affect the patterns of her foreign behavior.

China's behavior has already had a strong impact on both her enemies and friends, and she will play an even greater role in international politics in the future. China is no longer a mere object of world politics. She is one of the powers which shape and lead it. The study of her foreign behavior is now one of the most needed in the field of international relations, for, without this knowledge, we can say little about world politics or world peace.

#### 1.1 The Theoretical Perspective of This Study

The study presented here has two aims: First, the assessment of the validity of the major theme of Rummel's field theory,<sup>4</sup> and second, the development of an empirically applicable general model of China's foreign behavior based on field theory. By "empirically applicable" I mean that the model generated will be operational in that the practitioners of world politics can utilize it directly to

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<sup>3</sup>The Chinese have already exploded a missile-type H-bomb warhead. The first nuclear warhead carried by a guided missile was tested on October 27, 1966, which was her fourth test of a nuclear weapon (the first explosion was on October 16, 1964). For a detailed chronology of Chinese nuclear tests, see Yahuda, 1969, 198-9. *Time* (May 11, 1970, pp. 44-7) predicted that China would possess, at the latest, within 1970 at least some IRBMs with a range of 1,000 miles.

<sup>4</sup>The theory is still in the developing stage; parts of it, therefore, are continuously changing. However, the major theme of the theory (linear linkage between behavior and attribute difference) has been unchanged. Hereafter when field theory is referred to, if not specified otherwise, it means the one in Rummel, 1965.

get information about China's foreign behavior. By "general" I mean that the model should be applicable to any kind of behavior, at any point, in any circumstance and directed toward any object nation.

Most of the theories or models currently being developed in the field of international studies seem to be either so intricate as to defy operational definition, or so abstract as to relate to "world reality" in only the most remote way, or so specific to one aspect of national behavior as to lose general applicability. To be empirically applicable, in the above-mentioned sense of being useful to a practitioner, a theory or model should be general in scope, simple in form and operational in terms of measurable variables.

The major proposition of field theory is that "the behavior of one nation toward another is a linear transformation of their differences from each other on their attributes." Field theory is a general one applicable to all kinds of social units<sup>5</sup> and to all kinds of behavior, and takes one simple form to describe the proposed linkage between a nation's behavior and her attribute differences from others. The linkage equation is,  $WQ = DP + U$ , where  $W$  is a set of behavioral vectors,  $D$  is a set of attribute differences,  $P$  and  $Q$  are weightings, and  $U$  is an error matrix.<sup>6</sup> In this sense, the theory meets the first two of the three criteria of an empirically applicable model specified above: generality and simplicity.

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<sup>5</sup>Rummel, 1969b, p. 10.

<sup>6</sup>This equation will be discussed in detail in Chapter 3.

The main statement of field theory, however, is in a highly abstract form saying that there are linear relations between a nation's behavior and her differences and similarities with each other nation. The theory itself does not specify which behavior is related to which difference nor how they are related. In other words, in the above matrix equation, P and Q are not "theorized" by the model itself. Therefore, the theory is "abstract" and is not, by itself, related to the real world directly. In order to make the model complete for a particular nation, we need to specify the values of P and Q. The purpose of this study is to test precisely an empirically applicable model derived from field theory for Communist China by giving fixed numbers to P and Q in the above equation.

Field theory is a theory in the sense that it includes a universal generalization, *i.e.*, the statement that describes the relation between "the behavior of one nation toward another" and "their differences from each other on their attributes." The form of the relation is theorized as a "linear transformation." This proposition is regarded as a law, *i.e.*, the form of relations between behavior and the differences specified are theorized to be valid for any actor nation at any historical time point. A law remains a law insofar as the proposition is "corroborated" by experience.<sup>7</sup> In other words, if the proposed statement withstands empirical tests and is not falsified by the test, it remains a law.

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<sup>7</sup>See Popper, 1968, p. 33.

The first aim of this study was to test the validity of the statement of linear linkage between behavior and attribute differences with empirical data. If the proposed linear relationship were assessed by test results, *i.e.*, if high correlations were obtained from a linear fit, the theory is valid for the moment.

The second aim of this study was to formulate an empirically applicable model for China's foreign behavior based on field theory. As mentioned above, in field theory, the form of the relationship between a nation's behavior and her differences from each other nation on attributes is defined in a general form, a linear transformation, and the actual concrete relationship is left undefined. To make an empirically applicable model out of field theory, then, we need to specify the exact form of the relationship in terms of concrete figures (parameters), *i.e.*, to find the unique values of the P and Q matrices for China.

Pulling down the abstract field theory to a practically applicable model, however, required some preliminary work bridging the theory to world reality. First of all we needed to find empirically relevant meanings for P and Q within the context of field theory, since none were specified.

A nation's variation in foreign behavior can be analytically decomposed into two portions: one, universal behavioral patterns common across all nations; two, patterns attributable to that particular nation's idiosyncratic characteristics. To know the particular patterns, we must find the common universal patterns of

nations first, because the uniqueness of a nation's behavior is recognizable only when the universal patterns are understood.<sup>8</sup>

Common behavioral patterns have their origins in the fundamental characteristics of a nation. To explain this form of behavior, therefore, we may ignore the nation's unique attributes. This pattern is just a reflection of the laws which govern all nations' behavior. For example, we can say that Nepal will not attack China militarily within the next few years. Our knowledge of the weak military capability of Nepal leads us to this judgment. This means that we implicitly apply a basic law that large discrepancies in military capability discourage a weak nation from initiating military attacks against a strong one. This law is believed to be valid for any pair of nations of the world regardless of the characteristics of the nations involved. If we could have a set of universal laws which govern the basic behavior of nations, then we could explain a great portion of the behavioral variations in nations.

Particular patterns of a nation's behavior can be viewed as deviations from the universal ones. This means that the universal behavioral pattern is modified by a nation's idiosyncratic decision-making system. For example, each nation has her own perceptual framework, and when she makes her foreign policy decision, this specific framework may emphasize a certain factor among various components which compose her decision-making environment. For instance,

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<sup>8</sup>See A. Kaplan, 1964, p. 117. He stated, "differences are understood and explained only by reference somewhere to similarities: how we conceive of an individual is the product of generalizations."

we can say that it is probable that Egypt will cooperate with Syria in a certain common-market-type economic organization, but no one will think of a similar cooperative effort between Israel and Egypt. Why? We know that mutual economic necessity and geographic proximity as well as historical amity induce economic cooperation between nations (let us suppose that it is a universal law). In the case of Israel and Egypt, Israel probably has a unique perceptual framework which puts special emphasis on their religious-cultural differences (the historical antagonism factor) and, as a consequence, this unique decision-making pattern makes her behavior an exception to the universal law of proximity and mutual necessity in her economic cooperative behavior.

In this vein, we can say that in order to understand a nation's foreign behavior patterns, first we need to uncover the basic laws of behavior of all nations in general that underlie those patterns. Then, with the knowledge of these laws, we can proceed to delineate a particular nation's specific patterns of foreign behavior.

With this bifurcation of a nation's variation of behavior in mind, let us have a closer look at Rummel's field theory.

Rummel's social field theory, based on a field concept of world reality,<sup>9</sup> defines the forms of relationship between the behavior of a nation and her environmental conditions in rigorous mathematical functions, stating that, "[a nation's] behavior [toward another nation]

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<sup>9</sup>In Chapter 3, this will be discussed in detail.

is the consequence of the total social situation, and this situation forms a field consisting of social characteristics, or attributes. Behavior is relative ... to the relative similarities and differences of nations on their attributes ... behavior is a linear function of the relative location of the two [interacting nations] in the system of attributes ...."<sup>10</sup> More simply, "the behavior of one nation toward another is a linear transformation of their differences from each other on their attributes."<sup>11</sup> As a whole, this provides us with one basic universal law applicable to all nations.

As mentioned above, in order to understand China's unique patterns of foreign behavior, we need to know both the universal theory (a set of laws) underlying that behavior and the unique decision-making system idiosyncratic to China which modifies the universal laws. Since Rummel's social field theory tells us the basic relations between China's behavior and her attribute distances, what remains to be done is to define the specific decisional framework which would cause China to deviate from the universal behavior patterns of nations.

Within field theory, the weighting parameters, P and Q, in the equation may be interpreted as the actor's perceptual and behavioral framework, respectively. In reality, we can see that the same attribute distance is perceived differently by the decision-makers of different nations depending upon their personal experiences, belief

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<sup>10</sup>Rummel, 1965, p. 183.

<sup>11</sup>Rummel, 1969c, p. 2.

system, educational background, political value orientation, etc. For example, India may perceive religious distance from other nations to be more significant than does China who pays little attention to them. And even if they perceive attribute distances in the same way, the various decision-makers may respond differently according to their unique behavioral framework (or decision criteria). China, for instance, will probably adopt economic aid instead of military maneuvers in solving border disputes with small nations like Burma, if China's leadership has a special preference for non-violent solutions, even though the military solution may be more expedient. In this case, China has a unique pattern of behavioral choice which constitutes a particular behavioral framework. In this sense, I will call this model the "double subjective modification system" of a nation's foreign behavior. In brief, we can formulate an empirically applicable model for a nation's foreign behavior by inserting actual figures for P and Q which represent the nation's unique decisional framework. Methodologically, then, the second aim of this research was to determine the stable values of these two parameters of Rummel's model by its application to empirically collected data on China.

## 1.2 The Organization of This Paper

This paper is organized as follows. In Chapter II, past studies about Communist China's foreign behavior are examined with special emphasis on theories that have been applied to explain Chinese foreign behavior. In Chapter III, the model to be applied--Rummel's social field theory Model II--is presented and discussed in detail. The

discussion focuses on clarifying the meaning of the fundamental equation of the theory. The differences between the multiple regression model and the canonical regression model is especially scrutinized. In Chapter IV, the research design is presented, and variables and data used for this study are discussed in Chapter V.

From Chapter VI to Chapter X, the results of the analyses are given. In Chapter VI and VII, the basis dimensions of Attribute space and Behavior space are presented, respectively, and in Chapter VIII the results of testing field theory are given. In Chapter IX, China's foreign behavior patterns are discussed, and five different behavior patterns are illustrated in each of five sections; and in the sixth section, findings about China's foreign behavior patterns are summarized. In Chapter X, the results of testing the model's applicability are given. And, finally, we have the conclusion in Chapter XI.

In this study, data were collected on measures of attribute distances and China's behavior toward all nations for 1955 and 1963. Thirty-five variables for attribute distances and seventeen behavioral variables have been selected, most from the variable list used by the Dimensionality of Nations Project. Some variables, however, have been added to cope with China's unique perception and behavior, such as the percentage of overseas Chinese in the counterpart nation's population and Chinese attitude toward other nations reflected in the *Jen-min Jih-pao*. In this study all nations are included as objects of China's foreign behavior.

In order to make the points of the discussion and test results more comprehensible, virtually all of the test results are illustrated in twenty-seven tables and fifteen figures. In the appendix, raw data are presented to allow anyone to test the arguments I have made in this paper.

In order to make the test reliable, each step of the analysis was repeated four times; the first with the original data, the second with a reduced number of object nations, the third with the skewed variables transformed and the fourth with the reduced and transformed data matrices.

## CHAPTER II

### STUDIES ON COMMUNIST CHINA'S FOREIGN BEHAVIOR

In comparison with other areas of international relations, the study of China remains neglected and underdeveloped. Considering her extraordinary size and her potential role in the future course of history, we may say that the study of China has been "retarded" in development.<sup>12</sup> A simple check of the articles reported in several leading American professional journals manifests the symptoms of this retardation.

First, in quantity, the number of articles written about China's foreign behavior was extremely small compared to other fields and regions. For example, in *World Politics*, a quarterly journal of international relations in general, out of a total of 748 articles printed in the past twenty-one years (from Vol. 1 to Vol. 21), only five were related to China's foreign behavior (twenty-eight articles were about China). The *American Political Science Review* was more extreme. It allocated space for only one article about China's foreign behavior out of 774 articles contained in the last twenty volumes (eight articles were about China in general). The *Journal of Asian Studies* is an area-specific professional journal. Even this Asia-major journal has

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<sup>12</sup>The expression, "retarded," was used by Howard Boorman. See Boorman, 1960.

devoted less than one percent of its space to the study of Chinese foreign behavior.

Secondly, even among the scarce studies of Communist China's foreign behavior, most were purely descriptive works. Of the nine articles reported in the four journals above (a total of seventy-three volumes), only two can be regarded as theoretical attempts to explain or predict China's foreign behavior patterns.<sup>13</sup> These facts imply that either there have been relatively few publishable works on China's foreign behavior, or most American political scientists were not interested in the topic.

Johnson has captured well the current 'state of the art': "social science analysis has neither staged a 'take-off', nor begun 'the drive to maturity' ... in fact, in my opinion social science has yet to achieve 'the preconditions for take-off' from which it can begin to theorize about China "<sup>14</sup>

The theoretical retardation of China studies can be illustrated in a number of ways. For example, we have studies of Communist China's military policy based on general Communist foreign policy objectives without any agreement on what those objectives actually are (*e.g.*, Bobrow, 1964). Or without examining the fundamental relationship

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<sup>13</sup>These two are Smoker (1969) and Bobrow (1964). Note that this number refers only to the four journals examined. Recently, more books and articles have been published. For example, in 1967 alone, 17 books and 331 articles were reported in the *Bibliography of Asian Studies*. This is a worldwide publication list.

<sup>14</sup>Johnson, 1965, p. 256.

between the basic ecological situation of a nation and a nation's behavior, some have tried to explain China's foreign behavior based only upon the top decision-makers' ideological attributes (Tang Tsou, 1965). As discussed above, a top decision-maker's political orientation and/or *Weltanschauung* may formulate a unique perceptual or behavioral framework which modifies the basic laws governing the relationship between nations, but it alone cannot be a sufficient explanatory factor of a nation's foreign behavior. In fact, we may say that Mao's revolutionary strategy itself was a reflection of his perception of the ecological situation of Communist China in the past.

Many reasons for this retardation have been given. For example, Dorrill gave the following: 1) lack of available data, 2) inaccessibility to China (both physically and through the communication media), 3) language gap, and 4) a socio-politico system different from the Western world (Dorrill, 1964). But the basic reason is more likely the paucity of theoretical models applicable to the study of a nation's external behavior in general.<sup>15</sup>

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<sup>15</sup>For a taxonomic inventory of the theories in international relations, see Phillips (1969). If we classify existing theories by the analytical tools employed, we have the following seven kinds (some examples are given in parentheses): 1) descriptive statistics (Singer and Small, 1966; McClelland, 1967; North, Holsti and Brody, 1967), 2) inferential statistics (Brody, 1963; Haas, 1965; Zinnes, 1967), 3) probability theory (Richardson, 1960a; Horvath, 1963, 1967), 4) calculus (Richardson, 1960b), 5) topology (Lewin, 1951; this is a psychological work, but general enough to be applied in international relations), 6) linear algebra-graph theory (Harary, 1961; Brams, 1968), 7) linear algebra-factor analysis (Cattell, 1949; Alker, 1964; Rummel, 1965; Gregg and Banks, 1965; Tanter, 1966; Russett, 1967; Denton and Phillips, 1968).

This lack of theories, however, is not unique to the study of international relations. It is, to some extent, a common problem of the social sciences in general.

One of the functions of theory in the study of international relations, as in any field in the social sciences, is the organizing function (McClelland, 1966, p. 15, and Deutsch, 1966, p. 8). This means, as McClelland stated, that "theory orients knowledge by furnishing the means to put the pieces together." According to Thompson, "theory gives order and meaning to a mass of phenomena without which it would remain disconnected and unintelligible" (Thompson, 1955, p. 735). Without theory, therefore, a mere description of a situation is difficult, since we cannot decide which data are most worth getting.

Social reality is too complex to be described in full detail in all its aspects. This means that selection is of the essence. Theory "establishes relative priorities for further inquiries by establishing the criteria of significance" (McClelland, 1966, p. 15). Theory guides us as to what to look at, and what to describe. Therefore, theory is essential even in the description of a situation or a phenomenon.

For explanation of a certain behavior, theory is even more essential. To explain, in a broad sense, means to "make something intelligible or comprehensible" and "the aim of explanation is the reconciliation with our intellectual desires of the perceptions forced on us by the external world of nature" (A. Kaplan, 1964, p. 33). Then what is the actual process of explanation? Hempel and Oppenheim described it in the following way: "an event is explained

by subsuming it under general laws, *i.e.*, by showing that it occurred in accordance with those laws, by virtue of the realization of certain antecedent conditions ... the explanation of a general regularity consists in subsuming it under another, more comprehensive regularity, under a more general law."<sup>16</sup> Therefore, explaining a nation's behavior means to discover laws governing recurring regularities in observable behavior. And a theory, which includes empirically testable statements of lawlike generalizations,<sup>17</sup> can serve as a guide in seeking the underlying laws of behavior.

For a prediction, the function of a theory is the same as for an explanation, since "the logical structure of scientific explanation is identical with that of a scientific prediction, the only difference between them being the purely pragmatic one of the temporal vantage point of inquirer."<sup>18</sup> In the case of an explanation, we are seeking the conditions and a lawlike statement for the existing event; while in prediction we seek an event on the bases of existing conditions and a known lawlike statement. Since the theoretical structure of an

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<sup>16</sup>Hempel and Oppenheim, 1968, ch. 15.

<sup>17</sup>Rudner (1966, p. 10): "A theory is a systematically related set of statements, including some lawlike generalizations, that is empirically testable."

<sup>18</sup>Rudner, *ibid.*, p. 60. He viewed the structure of explanation as the following: "The formal structure of a scientific explanation of some specific event has three parts: first, a statement E describing the specific event to be explained; second, a set of statements C<sub>1</sub> to C<sub>n</sub> describing specific relevant circumstances that are antecedent to, or otherwise causally correlated with the event described by E; third, a set of lawlike statements L<sub>1</sub> to L<sub>n</sub>, universal generalizations whose import is roughly, 'Whenever events<sup>n</sup> of the kind described by C<sub>1</sub> through C<sub>n</sub> take place, then an event of the kind described by E takes place.'"

explanation and a prediction are identical, "we have an explanation for an event if, and only if, we could have predicted it."

If we can agree that the final goal of academic enterprise in international relations, as well as in other fields, is to understand and explain (thus predict) empirical phenomena or events occurring within the system concerned (Deutsch, 1968, p. 7), then a theory about the pattern of behavior to be studied must be formulated first. Then we can collect data (where the theory provides the selection criteria), and with the data, test the validity of the theory. If the theory is inadequate, it must be revised. We should then, as Deutsch stated, "re-examine concepts, methods, and interest and should search for new symbolic models (theories) and/or new strategies in selecting the major targets for the next attack" (Deutsch, 1963, pp. 3-4). Then with the revised theory, we should again repeat the above stages.

If we view the process of social science research in this way, what stage has the study of Communist China reached at present? Johnson aptly answered this question, "much of the work already done on Chinese communism has been in the nature of intelligence-collecting rather than social science research. This is neither surprising nor bad in itself, but intelligence compilation is not social science. (The major potential contribution of social science is its capacity to provide for systemic thinking about the nature of Chinese Communist society and politics.)"

"Without the systematic application of social science theory to Chinese data, intelligence will provide only the most superficial aids to understanding China ... we must have theory-specific studies of

Chinese politics (behavior) in order to use even the data that we now possess and in order to generate newer and better theories" (Johnson, 1965, p. 258).

Let us examine briefly an inventory of past China studies. In the first section, non-theoretical descriptive studies will be examined and in the latter section, some theory-oriented studies will be discussed.

### 2.1 Non-theoretical Studies on Communist China's Foreign Behavior

Among the scarce studies which dealt with China's foreign behavior, most were non-theoretical and dealt with China's relations with particular nations. Levi's "Nepal in World Politics" (1957), Hinton's *China's Relations with Burma and Vietnam* (1968), Fairbank's *The United States and China* (1958), Leng's *Japan and Communist China* (1958), and North's *Moscow and Chinese Communists* (1953) are some examples.

Though the main sources adopted for explanation differed among each of the studies (domestic condition, historical relations, China's traditional expansionism, etc.), one common thread appeared throughout: the emphasis was on the unique context within which China and a particular nations ought to behave. These kinds of studies are very helpful for grasping the uniqueness of the relations between that particular pair of nations. But, considering that uniqueness can be understood only when the common patterns are recognized by adopting some theoretical model, a mere description of interactions between the

two nations (China and her counterpart) does not provide us with a comprehensive picture of the situation.

Even though few in number, there are some fine general discussions of Communist China's foreign behavior as a whole. Barnett's *Communist China and Asia* (1960), Hinton's *Communist China in World Politics* (1966), Hsieh's *Communist China's Strategy in the Nuclear Era* (1962), and Levi's *Modern China's Foreign Policy* (1953) are examples.

One obvious characteristic about the above studies is that they did not formulate or apply any "theory" explicitly and consistently. This lack of theory made the generalizability of their findings significantly limited, and the abundant information they gathered could not contribute directly to succeeding research.

Hinton, for example, clearly stated his antagonism against theory saying that "I proceed on the basis of no general theory or political action: I find most such theories vague and pretentious ... Nor do I employ any unique or complex method based on some such general point of departure. I prefer history ... If there is a master key, it is context and educated intuition" (1966, preface viii, underlining added).

One common characteristic of the explanatory schemes of these non-theoretical, general studies was that common sense and human intuition served as the foundation of understanding. They all described in full detail the contextual situation under which Communist China decides her foreign behavior, by using such historically well known concepts as motivation, national goal, ideology and national

power as a working framework. Then implicitly relying on the reader's intuitive logic, they tried to connect the contextual situation and China's decisions. In a rough sense, therefore, they also use a crude form of theory about human behavior (e.g., under a specific circumstance, all men are expected to behave in such ways," etc.), while expressedly denying them.

Hinton, for example, denied theories. Nevertheless, his suggested five "roots of Communist China's foreign policy" (the traditional superiority complex, historical anti-Western attitude, backwardness in economic and social development, ideological and political support from the Soviet Union and Maoism ideology<sup>19</sup>), with which he explained China's foreign policy, were all based on social scientific theories (e.g. psychological attitude theory, economic theory, linkage theory,<sup>20</sup> etc.); though these theories were not explicitly referred to, they were assumed implicitly.

In general, the problems of non-theoretical studies can be summarized in two points. First, without theoretical construction, the generalizability of the explanation is reduced. Without a bridge of common theory, we cannot apply the findings generated from one

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<sup>19</sup>Hinton, 1966, Part One, section 1, pp. 3-22.

<sup>20</sup>A linkage theory is a theory that postulates the form of the relationship between domestic political process of a nation and her outside environmental or political phenomena. Since the time when Rosenau suggested the necessity of developing linkage theories in 1966, there have been several attempts to develop theories within the conceptual framework of the linkage idea, but not rigorous theory has yet been developed. For the conceptual framework, see Rosenau, 1969, Chapter 3, and for the examples of theorizing attempts, see Chapters 4-12.

study to another. Furthermore, without theory, we cannot compare the results of one study with those of other similar studies, since we do not have any common frame.

Second, without theory, we cannot "explain" and "predict" behavior scientifically, since the logical structure of explanation presupposes a theory. Besides theory, we have some other explanatory schemes like the metaphor and the analogy. Metaphors, for example, are important aids for explanation, since they may make the reader have the experience of "understanding." But a "metaphorical model cannot be expected to yield logically compelling theorems which are translatable into prediction."<sup>21</sup>

## 2.2 Theoretical Studies on Communist China's Foreign Behavior

Recently (since 1960), theoretical studies about China's foreign behavior began to appear either as a part of a global study, or as an independent one. But again most deal with China's behavior toward one or a few particular nations. Zagoria (1962), Greaser (1966), Bobrow (1965), McClelland, *et al.* (1967), Sullivan (1964), Zaninovich (1964), Smoker (1969) are some examples.

Although limited in both scope and the number of nations involved, their contribution to the knowledge of China's foreign behavior is significant. For example, McClelland's study (McClelland, *et al.*, 1967) was limited geographically (Quemoy and Tachen Islands),

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<sup>21</sup>Rapoport, 1958, p. 51.

in time (1950-1964), and in the number of nations involved (Communist China, Nationalist China, U.S.A. and U.S.S.R.). The type of behavior was also restricted to political-military action in regard to limited confrontations. With these restrictions, however, they determined some basic patterns of Communist China's crises and non-crises behavior in general with consistency and repetition of behavioral forms over time (p. 3). Thus this finding could serve as a model for dealing with China's behavior under similar conditions.

Sullivan's (1964) study was similar to McClelland's. Starting his research with a general hypothesis that "certain types of societies will tend to routinize their behavior after a crisis and a relationship of stability will be restored," he tried to discover the interaction patterns of China *vis-à-vis* other nations and the changes in these patterns during and after crises periods. Again, with this kind of theoretical approach, Sullivan contributes knowledge which can be applied to other studies.

Zaninovich's study of the Sino-Soviet dispute was to analyze the interaction patterns of the two nations applying the "mediated stimulus-response model," a kind of behavioral model of the relationship between behavioral stimulus and perceptual response. Again, this research, though it deals with only one dyadic relation, could contribute to the knowledge of China's interaction pattern (or of any nation's pattern), because the theory tested was general and applicable to any pair of nations.

Bobrow's studies were especially highly sophisticated and innovative. His basic theoretical stance on a nation's international behavior has been that international behavior is the product of an interaction between action and situation attributes. (This is inferred from his four articles: 1964, 1965, 1967, 1969b). From this basic notion he tried to establish a working model that would depict China's own behavioral system in response to the situation she encounters.

In "Chinese Communist Response to Alternative U.S. Active and Passive Defense Postures" (1965), Bobrow, guided by a further assumption that "the Chinese act on the basis of what they believe to be reality" (p. 2) tried to build a psychological theory applicable to China's responsive pattern to changing American policy toward her. Thus, he contributed significantly to the advancement of analytic studies of Chinese foreign policy, though he dealt with only particular dyad, *i.e.*, China *vs.* U.S.A.

There have been very few theoretical works which explain the overall pattern of Communist China's foreign behavior. Among China's foreign behavior literature, the single title which fell into this category was Bobrow's "Ecology of International Games: Requirement for a Model of the International System" (1969). What Bobrow attempted was to build a new theoretical model of a nation's overall behavior pattern, and to test the model with China data. After examining all current theoretical approaches, namely, the system, actor and situation approaches, Bobrow argued that we must incorporate the powerful contributions of all three. He further suggested the new models have to be ones of the interaction of actor games and encountered situa-

tions, and finally formulated a theoretical model called "a game ecology-situation module."

With this theory, he experimented with observed data to discover the "ecology of international games in which Communist China is engaged" (p. 14). Methodologically, he factor analyzed China's action data to delineate the "structure of China's action space" and then searched for the extent of association between these activity factors and the universe of political actors. He, however, did not theorize the association. He simply tried to discover empirically regular patterns of association between the actor factors and the types of ecology. In this sense, his study may be regarded as a precursor of theoretical research on China's foreign behavior, but not as a real theoretical study itself.

There were some studies based on some pre-theories, however. By "pre-theory," I mean a conceptual framework which includes one or more lawlike generalizations, but without any specified relationship among variables. "Pre-theoretical" studies are different from non-theoretical studies, since they are guided by an explicitly adopted "theory."<sup>22</sup> However, they differ from the rigorous theoretical

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<sup>22</sup>When I listed some non-theoretical studies, I mentioned that we could find some underlying pre-theories. But in their case, theories were not explicitly nor consistently adopted by the authors. In the pre-theoretical studies, however, theories were explicitly and consistently referred to.

studies, since their "theories" lack certain essential qualities.<sup>23</sup>

In this group of studies, I put Halperin and Perkins (1965), North (1969), Scalanino (1963), and an earlier work of Bobrow (1964). Halperin and Perkins (1965), for example, used a "theory" based on the concepts of "national interest" and "ideology." To infer Chinese national interest and ideology, they manipulated a selected array of variables, "relevant political, ideological, economic, technological, military and cultural factors, as well as predisposing historical and traditional influences,"<sup>24</sup> though the variables were not fully clarified in the main text.

Among all the studies in this group, North's (1969) is most prominent. In his introduction to *The Foreign Relations of China*, an undergraduate textbook, North clarified his theoretical perspective. Starting with assumptions of multicausality, he suggested three basic explanatory concepts with which a nation's foreign behavior is analyzed: capability, political leadership, and political culture and institution. Then, he intended to "show, insofar as possible, how they [the concepts] related to each other and how they combine to account for extensive aspects of Communist China's international activities" (pp. 2-3). Especially in the discus-

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<sup>23</sup>To be a theory, a conceptual framework should have at least one lawlike, generalizable statement constructed in terms of concepts which are measurable and empirically testable. See Rudner, 1966, p. 10; A. Kaplan, 1964, pp. 294-8; and McClelland, 1966, pp. 6-16.

<sup>24</sup>See Lindbeck's foreword of the book.

sion of the dynamic aspects of a nation's foreign behavior, he tried to apply basic notions of status theory (disparity of actual power status and desired status) and of the power transition theory (the relations between new challenging power and the old powers). As a whole, his thinking provided us with an invaluable theoretical framework for foreign behavior study, although he did not propose a rigorous theory.

Bobrow's study on China's military foreign behavior (Bobrow, 1964) is also a good example. To set forth the "calculus or rationale which Peking employs to select military strategy and tactics," Bobrow employed a well-known traditional conceptual framework composed of such concepts as national goal, domestic requirements, etc. Under the assumption that "Peking's leaders adopt what they believe to be the best available military policy to cope with what they perceive to be challenges of foreign opponents, to attain their foreign ambitions, and to satisfy domestic political and economic needs,"<sup>25</sup> Bobrow tried to analyze four components of China's military calculus: expectations regarding the United States, foreign goals, domestic requirements, and interpretations of previous military experience.

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<sup>25</sup>Notice that this assumption, itself, is a kind of theory, a mixture of a stimulus-response type interaction theory and a theory based on rationalism.

From the brief review above, we may conclude that "social science has yet to achieve the preconditions for take-off from which it can begin to theorize about China."<sup>26</sup> To proceed, therefore, we must have more theory-specific studies of China's foreign behavior. As discussed before, studies without theories have only limited utility to describe the present and predict the future nature of Chinese behavior and its determinant. Some "fundamental restructuring and innovation in our tools of concept and method are required to improve our description and predictive capabilities."<sup>27</sup>

Then, practically, what should be done? Bobrow suggested the following:<sup>28</sup> "Wise selection of nations trait variables and careful collection of information about China and other nations for those variables [should be carried out] to increase our ability to 1) measure the extent and direction of differences between national traits at different times; 2) establish empirically the extent to which China tends to cluster near to (be similar to) or far from (be different from) other nations; 3) assess the descriptive utility of alternative conceptual typologies and the limits of their applicability; 4) test hypotheses about the statistical co-occurrence of particular traits of nations; 5) determine the nature of the relationship between national traits (input variables to national élite

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<sup>26</sup>Johnson, *op. cit.*, p. 256.

<sup>27</sup>Bobrow, 1967, p. 306.

<sup>28</sup>Bobrow, *Ibid.*, p. 309.

decisions); and national policies (output variables form national élite decisions); and 6) on the basis of analyses of this fifth type select hypotheses about the reasons for policy choices."

I can agree with all these suggestions. What I intended to do in this research was to theorize China's foreign behavior and to select basic indicator variables with which we can explain and predict such behavior. My grand design has been to provide a stepping stone between the present "pre-conditions for take-off" and the future "take-off" stage in studies of China's foreign behavior.

## CHAPTER III

### RUMMEL'S SOCIAL FIELD THEORY: THE MODEL TO BE APPLIED

Philosophically, Rummel's social field theory is based on the concept of the world as a field. Rummel views social reality as "a field consisting of the attributes of social units and their interactions. Attributes are those characteristics by which a social unit can be differentiated from all other social units. The behavior that social units direct toward each other are their interactions (Rummel, 1968a, p. 26)."

Theoretically, Rummel's social field theory is rigorously structured. Based on seven well formulated axioms, it postulates a law which defines the form of interrelationship between the behavior of a social unit and the relative attribute differences of that social unit from others. The heart of the theory is the basic mathematical equation representing the model of the relations defined by the above law. The analytic system employed is linear algebra, and many constructs in the theory are expressed in terms of linear algebraic concepts.

In the first section of this chapter (3.1), the conception of social reality that underlies field theory will be discussed briefly in conjunction with some other basic world views. In section 3.2, I shall discuss the concept of a "field," the core concept of field theory, reviewing its various applications in order to exemplify the philosophical background of the theory. In section 3.3, the theoret-

ical structure of Rummel's field theory will be elaborated on. Then, in section 3.4, the basic equation of the theory will be presented.

### 3.1 The World Conception of Field Theory

Social laws are universal generalizations of relationships between two or more phenomena.<sup>29</sup> Therefore, social laws cannot be empirically "discovered," since empirical observations cannot exhaust all possible relationships and a universal generalization, therefore, is impossible. Also, a mere summarization of observational findings does not provide the logical nexus among phenomena.<sup>30</sup> Laws must be "formulated." "Guided by his knowledge of observational data, the scientist has to invent a set of concepts--theoretical constructs (which will provide the necessary logical nexus between phenomena)."<sup>31</sup> In this sense, laws are products of the scientist's intuition and, as a result, there are no absolute laws. Laws remain as laws insofar as they serve to explain observable phenomena. Therefore, laws are,

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<sup>29</sup>A formal definition of social laws may be given as "statements or equations that will explain or state the form of a relationship between terms in the analytic system." A. Kaplan distinguishes laws from other scientific statements, calling laws "truly universal nomological generalizations, unrestricted as to space and time." (A. Kaplan, 1964, p. 91).

<sup>30</sup>See Hempel, 1952, p. 19. See also Popper, 1968, p. 27.  
" ... it is far from obvious, from a logical point of view, that we are justified in inferring universal statements from singular ones, no matter how numerous; for any conclusions drawn in this way may always turn out to be false: no matter how many instances of white swans we may have observed, this does not justify the conclusions that all swans are white."

<sup>31</sup>*loc. cit.*

inevitably, reflections of the scientist's conception of social reality.

Historically, the reality<sup>32</sup> of international relations has been understood in many different ways. For example, ancient Confucianists in China believed that there exists a perfect universal order (*tien-ii*, i.e., Heaven's will), and actual politics (both domestic and international) are the processes of the realization of that order.<sup>33</sup> Later in Western society, Hegel took a similar position about the reality of international relations. He believed that "reason is the substance of the universe ... the design of the world is absolute rational."<sup>34</sup> Hegel thought change and motion (which are supposed to have a predetermined pattern) as the only reality and tried to "identify this reality with the historical process of continuous building and becoming."<sup>35</sup>

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<sup>32</sup>For the usage of the term, "reality," see Wright, 1955, p. 11. He states that "I believe it [reality] is commonly used by scientists, to designate existence in time and space apart from any observer, assuming without argument that time and space are characteristics of a world which exists apart from the observer."

<sup>33</sup>See Lee, 1966, pp. 341-60. The Confucianist concept of the world was well illustrated in *The Chung-yung*, one of the *Four Great Books*.

<sup>34</sup>Hegel, *Philosophy of History*, Hohn (ed.), pp. 9-13, quoted in Durant, 1953, p. 224.

<sup>35</sup>Wright, 1955, p. 10.

If we conceive of world reality as a planned process<sup>36</sup> as the Confucianists and Hegel, we need not pay great attention to the outside environment of a nation in order to explain and predict its foreign behavior. We need to study history (Hegel) or natural laws through introspection (Confucianists) to identify the "inevitable progress" of civilization to explain changes in a nation's foreign behavior as well as other social and political changes.

Currently for Morgenthau, reality in international relations is "power politics," which "is governed by objective laws that have their roots in human nature (unchangeable), ... statesmen think and act in terms of interest defined as power."<sup>37</sup>

He assumed that, first, states are entitled to exist, and, second, to preserve their independent identities, states can rely only upon power to avoid conquest by their neighbors. Consequently, the struggle of each to be more powerful than any probable enemy is natural. To Morgenthau, the reality of international relations is the struggle of nations for power, and the mechanics of social equilibrium is the core concept describing the process of this struggling reality.<sup>38</sup> Thus, Morgenthau's belief in power politics is based on

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<sup>36</sup>Wright classified world views into five kinds; the world as a plan, the world as an equilibrium, the world as an organization, the world as a community, and the world as a field. According to this classification, the above examples of Hegel and the Confucianists belong to 'the world as a plan,' while Morgenthau's (see next paragraph) belongs to 'the world as an equilibrium.' For further discussion, see Wright, *ibid.*, pp. 485 and 488.

<sup>37</sup>Morgenthau, 1966, pp. 4-5.

<sup>38</sup>See Morgenthau, *ibid.*, pp. 162-163.

his concept of the world as an equilibrium, and to him international relations is a simple mechanical system, changing along with the varying power distribution on each side of the antagonistic groups to maintain the balance of power.<sup>39</sup> To him, therefore, "calculations of the aggressive and resisting power of each and the distances and barriers which separated them might sufficiently determine the stability of the system ... and social, moral, and ideological factors might be safely disregarded."<sup>40</sup>

Departing from these simple mechanistic views of reality in international relations, Wright tried to view the world as "a field of conditions, values, ideals, and attitudes, in contiguous flux ... exerting influence upon the actions of individuals, associations, and nations."<sup>41</sup> According to him, the behavior of human beings is conditional on their environmental situation, and discovering the forms of relations between specific patterns of environmental conditions and patterns of the actor's behavior is essential in order to explain and predict the behavior.

Rummel's field theory is based on such a view of world reality. Behavior is believed to be the consequence of the total social

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<sup>39</sup>*Loc. cit.*

<sup>40</sup>Wright, 1955, p. 488.

<sup>41</sup>Wright, *ibid.*, p. 499.

situation which forms a field consisting of social characteristics, or attributes.<sup>42</sup> The above is consonant with my concept of a nation as an organic system composed of systematically related roles played by human beings, where its foreign behavior is the reflection of the decisions made by the top decision-makers of the nation system. And I think that it is likely that there are laws that specify the forms of relationship between patterns of decisions (therefore, the behavior) and the patterns of environmental conditions including the personal psychology of decision-makers, the nation's attributes, and the relative similarities and differences with the other nations. It is this similarity in world view that made me choose Rummel's field theory as the guiding theory of this study.

### 3.2 Concept of a Field

The concept of a field is not new. The notion has existed since the time of Euclid.<sup>43</sup> What is new to us, however, is its application in modern science.

#### 3.2.1 The Field Concept in Physics

Even though the notion of a field has been an age-old concept in physics, it was only when Maxwell first introduced it by formulating the law of electromagnetism in the 19th century, that the concept

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<sup>42</sup>Rummel, 1965, p. 183.

<sup>43</sup>For various applications of the field concept in history, see Wright, 1955, pp. 524-8.

began to play a great role in various theories."<sup>44</sup>

In Newton's mechanics, a system is completely described when the location of the constituent mass points are known as functions of time. But in Maxwell's field theory, "the field variables are defined for all values both of the time coordinate and of the three space coordinates, and are thus functions of four independent variables."<sup>45</sup> More important with Maxwell's field theory, however, is the notion of field strength or intensity. That is, the force acting upon a mass point is determined by the field in the immediate neighborhood of the mass point, and conversely, the presence of the mass point may and usually does modify the field. In other words, a field of force whose "attribute ... at any point is measured by the force which the field exerts upon a unit mass placed at that point."<sup>46</sup> was conceived. It was the very idea of a relationship between the attribute of the point and the force exerted at the point that was adopted by social scientists to explain social phenomena.

In general, a field is defined as "a region of space in which a given effect (as gravity, magnetism ...) exists and has a definite value at each point."<sup>47</sup> Modeled after that, social scientists defined a field as "a complex of coexistent forces (as biological, psychological and social or interpersonal) which serve as causative agents

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<sup>44</sup>Beriman, 1942, p. 16.

<sup>45</sup>Beriman, *Ibid.*, p. 17.

<sup>46</sup>Webster's *Third New International Dictionary*, 1968. For a mathematical definition of "field," see Yilmaz, 1965, pp. 62-3.

<sup>47</sup>*loc. cit.*

or as a frame of reference in human experience and behavior."<sup>48</sup>

Another influence of physical field theory on the social sciences is the concept of distances. "In Newtonian mechanics, the idea of position or location seems to be fundamental. From it we derive distance or extension as a subsidiary notion. Position is looked upon as a physical fact--as an identifiable point of space--whereas distance is looked upon as an abstraction or a computational result calculated when the positions are known. Field theory reverses this view. Distance (extension, interval) is now fundamental; the location of an object is a computational result summarizing the physical fact that it is at certain intervals from the other objects in the world .... In brief, space is not a lot of points close together; it is a lot of distances interlocked."<sup>49</sup> This idea is directly reflected in Galtung (1964) and Rummel (1965).

The third idea similar to physical field theory is the coordinate system in social field theory. As we have seen above, field in physics is defined by a time-space four dimensional coordinate system. Wright's field theory started with the introduction of the coordinate system (See 3.2.3).

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<sup>48</sup>*Loc. cit.*

<sup>49</sup>Eddington, 1957, pp. 9-10.

### 3.2.2 Lewin's Field Concept

The most comprehensive among earlier attempts to utilize the concept of field in social science studies was Lewin's (1964).<sup>50</sup> To cope with a multitude of factors influencing an event, he used the "construct" field. He conceived of all behavior as "a change of some state of a field in a given unit of time (dx/dt)." In treating individual psychology, the field is the "life space" which consists of the person and the psychological environment as it exists for him.<sup>51</sup> In dealing with group psychology or sociology, a similar formulation was proposed. Lewin viewed that the social happening occurs in, and is the result of, "a totality of coexisting social entities, such as groups, subgroups, members, barriers, channels of communication, etc."<sup>52</sup> He also viewed that the relative position of the entities (within the field) represents the structure of the group and its ecological setting and that this relative position expresses also the basic possibilities of locomotion within the field."<sup>53</sup>

To summarize, his "construct" of behavior is viewed as a function of life space:  $B = f(P, E) = f(LSp)$ , and explaining behavior (B) then is identical with 1) finding a scientific representation of the

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<sup>50</sup>Since this is a collection of ten different works by Lewin, the exact year cannot be given here. 1964 is the year of publication of the book which includes papers published between 1940 and 1947.

<sup>51</sup>Lewin, 1964, p. xi.

<sup>52</sup>*Ibid.*, p. 200.

<sup>53</sup>Lewin, 1964, *loc. cit.*

life space (LSp) and 2) determining the function ( $f$ ) which links behavior to the life space.<sup>54</sup> But Lewin did not formulate the function. He only suggested the broad relationship between a unit's behavior and its setting, but neither mathematized the structure of his "theory," nor his deduction. Therefore, his construct remained short of a theory.<sup>55</sup>

### 3.2.3 Wright's Field Concept

Wright (1955) defined a field as "a system defined by time and space or by analytical coordinates, and by the properties, relations, and movements of the entities within it."<sup>56</sup> He believed that every situation can be conceived as a field by postulating suitable coordinates. Then he argued that a "description of the field provides a basis for explaining the past and in a measure predicting the future of the entities (within the field)."<sup>57</sup> On the basis of these postulates, he presented a verbally structured field theory applied to international relations.

Wright suggested two different types of fields, geographic and analytic. The former "locates the people and groups of the world and their characteristics, motivations, actions, institutions, and

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<sup>54</sup>*Ibid.*, p. 240. B = behavior, P = person, E = environment, LSp = life space and  $f$  = "function of."

<sup>55</sup>For theoretical comment on his theory, see Rummel, 1968a, p. 23, note 10.

<sup>56</sup>Wright, 1955, p. 524.

<sup>57</sup>*Loc. cit.*

conditions in actual time and space."<sup>58</sup> And the latter implies that "each international organization, national government, association, individual, or other 'system of action,' or decision-maker may be located in a multi-dimensional field which is defined by coordinates, each of which measures a political, economic, psychological, sociological, ethical, or other continuum influencing choices, decisions, and actions important for international relations."<sup>59</sup>

Then observing movements of the entities across time within the field, and analyzing relative distances among entities, he tried to link behavior to its setting defined by the given situational dimensions.

Compared to Lewin's field theory, Wright's has some advantages since its coordinate system and vector notions give it potential for developing equations relating behavior to structural dimensions. But Wright himself did not formulate any generalizable lawlike statement concerning the relationships, nor did he provide any tool to define inter-relations among the dimensions of the field. In brief, his ideas were not integrated into a rigorous theory.

#### 3.2.4 Rummel's Field Concept

Ten years after Wright's verbal formulation of the concept of a "field," Rummel systematized a "social field theory" using a linear algebraic model (Rummel, 1965).

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<sup>58</sup>Wright, 1955, p. 540.

<sup>59</sup>*Ibid.*, p. 543.

The basic philosophy of Rummel's social field theory, as I have quoted elsewhere, is that "behavior is the consequence of the total social situation, and this situation forms a field consisting of social characteristics, or attributes, which stand in definite relation to each other (Rummel, 1968a)."

One notable departure of Rummel's concept from Wright's and others' is the structure of the field. Wright, for example, considered the Cartesian coordinate system for the structure of the fields he conceived. Since Cartesian space has orthogonally-fixed coordinates, and Wright assigns each of the attribute dimensions to each of these coordinate axes, we cannot express the relationship among the attribute dimensions in this space. But Rummel's field is a vector space where the attribute distances and nation's behavior are represented by vectors which can denote both the magnitude (in terms of length of the vector), and interrelationships among various attribute dimensions and behavior (in terms of the angle between vectors).

Rummel "analytically divides social reality into two vector spaces. One space is that of attributes of social units, and the other is that of behavior between social units. Within attribute space, each social unit is located as a vector in terms of its attributes. Within the behavior space, every pair of social units, called a dyad, is located as a vector in accordance with the interaction of the two members (Rummel, 1968a, p. 24)."

A basic characteristic of Rummel's concept which sets it apart from Wright's is the notion of distances. Wright also considered

various attribute distances (geographical, psychological, technical) as acting as forces influencing international relations (Wright, 1955, p. 297). In his field structure, however, the individual nation's attribute vector (the location of a nation in the field and the magnitude of the variance of the attributable variable) are regarded as fundamental and the distances (differences) are looked upon as a subsidiary notion or as a computational result calculated from known positions of the nations.<sup>60</sup>

But in Rummel's field, distance is regarded as fundamental. A justification for preference of distance to magnitude was given by Rummel, drawing on an analogy with small group behavior: "The total behavior of an individual in a social group is highly related to his personality characteristics. Place an individual in different groups and his behavior will shift as a function of his personality differences with members of the group. That is, relative distances on personality dimensions between individuals influence behavior more than the actual characteristics themselves. Likewise, for nations it is social, economic, political, and geographic distances that influence international behavior. Differences in technological levels, values, power, and perception of the international order relate to the 'moves' that nations direct toward each other (Rummel, 1968c, p. 214)." In

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<sup>60</sup>For example, he considered, "the relations of friendliness or hostility of two systems of action can be indicated by the direction of their vectors toward or away from one another in the value field." (Wright, 1955, p. 545). He did not directly utilize the distance vector as a force in determining relations.

this sense, Rummel's field concept is more similar to the original concept of a field in physics rather than to other field concepts.

As we have seen, the basic philosophy of Rummel's field theory overlaps partly with Lewin's and Wright's. Indeed, there is little that is new about Rummel's field theory in its components. What is new is that "it integrates an orientation toward social reality and research with mathematics and some social propositions in a different way. The theory represents a reorientation toward social action, a different point of view." (Rummel, 1968a, p. 24) Being well integrated into a rigorous scientific theory, once the truth of the lawlike statement of the theory is validated by empirical testing, then the whole theory will serve as a useful general explanatory model about social behavior applicable to international relations,<sup>61</sup> i.e., as "a framework within which deduction about social action and international relations may be made."<sup>62</sup> This is the merit of Rummel's social field theory.

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<sup>61</sup>Field Theory is a general theory applicable to all kinds of social units. If we define social reality as international relations and social units as nations, then it serves as an international relations theory, and "we can represent international relations within the analytic structure of field theory and then describe the linkage between a nation and its attributes by the theory (Rummel, 1969b, p. 10)."

<sup>62</sup>Rummel, 1968a, p. 24.

### 3.3 The Structure of Rummel's Social Field Theory: Seven Axioms

Rummel's social field theory (hereafter, it will be referred to as simply field theory) is based on several assumptions: 1) that a nation's attributes and behaviors coexist in a field and that the whole field is relevant to understanding the specific behavior; 2) that the past is presumed to operate through behaviors and attributes currently coexisting in the field; and 3) that absolute magnitudes of behaviors and attributes are considered irrelevant; what is relevant is the relative behavior between nations and their attributes relative to each other (Rummel, 1969c).

These assumptions of field theory are mathematically structured in the following way.

1) The international field of attributes and behaviors is divided into two infinite vector spaces, one of behaviors and the other of attributes.

2) In attribute space, nations are projected as vectors according to their standardized attributes scores, and in behavior spaces, nations are coupled into nation dyads by the behavior of one nation to another, and all possible dyads are projected into this space as vectors.

3) The linkage between the two spaces is postulated as a linear dependence of a dyad's position in behavior space on the distance vectors between the nations in attribute space. These distance vectors are then conceived of as social forces affecting international behavior.

Formally, field theory consists of seven axioms, describing social reality and functionally relating the behavior of social units to their attributes. The seven axioms are:<sup>63</sup>

- Axiom 1. International relations is a field consisting of all the attributes and their complex interrelationships.
- Axiom 2. The international field can be analytically divided into attribute, A, and behavioral, B, spaces into which attributes and interactions are projected, respectively, as vectors.
- Axiom 3. The attribute and behavioral spaces are generated by a finite set of linearly independent dimensions.
- Axiom 4. Nations are located as vectors in attribute space and coupled into dyads in behavior space.
- Axiom 5. The distance vectors in A-space that connect nations are social forces determining the location of dyads in B-space.
- Axiom 6. The direction and velocity of movement over time of a dyad in B-space is along the resolution vector of the forces,  $d$ .
- Axiom 7. B-space is a subspace of A-space.

Axiom 1 is a definitional statement. It says that the field consists of all the attributes and interactions of nations and their complex interrelationships. Here the attributes are not properties of the nations, but the quantities that define positions of the elements in the field *vis-à-vis* other nations. Any descriptive concept which can differentiate the position of a nation within the field from

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<sup>63</sup>The mathematical structure of the seven axioms of field theory is given in Rummel, 1965, Appendix I.

other nations can be an attribute variable. These may be such distinctions as size, shape, income, education, race, values or geographic locations (Rummel, 1968a, p. 16). Therefore, they may be infinite in number.

Interactions of nations are defined as behavior acts; any action of one nation toward a specific other nation. This action then couples the two nations together. Two nations so coupled by the actions of one are called a dyad and the action involved is dyadic behavior.

Attributes and behaviors are all in one space and they are all inter-related in a complex way. An attribute is not only related to other attributes but also to behavior. The focus of field theory is to find specifically the relations between attributes and behavior among other relations. Axiom 2 is postulated to separate all these complex interrelationships into these two groups. The separation is purely for the purpose of the theory. The second part of the axiom is designed to connect the reality of international relations with an analytic system, linear algebra. No longer simply a tool for analysis, linear algebra is an intrinsic part of the theory itself, and any deduction possible within it is allowable in this theory.

As stated above, the spaces defined by Axioms 1 and 2 could be infinite in their dimensions. To make the space finite, so that we can handle it, we need Axiom 3 which implies that if a behavior is

dependent on any set of attributes, then it will be dependent on a basis<sup>64</sup> (which is finite) of A-space.

Axiom 4 defines the constructs of A- and B-spaces. By Axiom 2, the field is separated into two analytic spaces, in which attributes and interactions are represented as vectors. By the fourth axiom, we also represent nations and nation dyads as vectors. Since the same nations are plotted in the two spaces (in A-space, as a separate entity; in B-space, as dyads), this provides us with an important bridge to connect the two spaces.

Axiom 5 is the core of the field theory. It relates attribute space to behavior space. The axiom is not an analytic, nor a definitional statement, but an empirical one which is falsifiable. This axiom makes the whole theory a testable one.

The relationship between A- and B-spaces defined by Axiom 5 is static. To give a dynamic interpretation to this, we need Axiom 6 which stipulates, 1) that the position of any dyad in B-space shifts according to the changes in the forces of A-space (this implies that the origin in B-space is the stable equilibrium of all the social forces), 2) that the changes occur along the resolution vector of the forces, d. This axiom is also non-analytic, whose truth can be verified by an empirical test. This proposed study, however, will deal only with the static relations postulated in Axiom 5.

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<sup>64</sup>A basis is a set of vectors which span the space. Therefore, any linear transformation of a basis is also a basis of the space, since it also spans the space. The dimensionality of a basis is unique, but the basis itself is not unique. For further detailed discussion, see Rummel, 1970a, pp. 66-71.

Finally, Axiom 7 tells us that B-space is completely contained in A-space and a basis of B-space is a linear combination of a basis of A. This axiom is not based on philosophical grounds but on a technical necessity. It provides a favorable condition under which we can connect the two spaces mathematically (see the next section). On the other hand, it may reduce the generalizability of the whole theory. If we can innovate the necessary mathematical manipulations this axiom can be deleted.

### 3.4 The Model of Field Theory

A theory is one of many possible interpretations of a calculus.<sup>65</sup> In field theory, the calculus is the analytic system composed of the seven axioms described above. When we interpret one or more lawlike statements of the analytic system, within the context of the system, such that the interpreted relation can be tested empirically, we have a theory. By employing a different semantic rule, we can interpret the same calculus in different ways, and thus establish another theory. So far as we do not violate any part of the contents of the axioms, all interpretations are isomorphic to each other. Therefore, even though they are different models, they are still the same theory.

The lawlike statement which is empirically falsifiable, in field theory, is the fifth axiom: the distance vectors in attribute space that connect nations are social forces determining the location of

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<sup>65</sup>"A model for a theory consists of an alternative interpretation of the same calculus of which the theory itself is an interpretation (Rudner, 1966, p. 24)."

dyads in behavior space. Depending upon how we operationalize the attribute distances and how we relate these distance vectors to the location of dyads in behavior space, we have different models of field theory.

### 3.4.1 The Basic Equation

The fundamental linkage between behavior and attributes proposed by Rummel, is

$$v_{i \rightarrow j, k} = \sum_{l=1}^p \alpha_l d_{i \rightarrow j, l} \quad (1)$$

where  $v_{i \rightarrow j, k}$  is the  $k$ -th dimension of B-space and  $i \rightarrow j$  is a particular dyad, nation  $i$  as the actor and nation  $j$  as the object. The term  $d_{i \rightarrow j, l}$  is one of the elements of the distance vector between nations  $i$  and  $j$  on the  $l$ -th dimension in A-space and  $\alpha_l$  is a weighting scalar parameter on that dimension.

1) The term  $d_{i \rightarrow j, l}$  is the distance vector from nation  $i$  to  $j$  on the  $l$ -th attribute dimension. If we define nation  $i$ 's value on the  $l$ -th coordinate as  $a_{i, l}$  and nation  $j$ 's value as  $a_{j, l}$ , then,

$$d_{i \rightarrow j, l} = a_{j, l} - a_{i, l} \quad (2)$$

For example, China's GNP in 1962 was 42 billion U.S. dollars, while Japan's was 77 billion.<sup>66</sup> In this case, the distance from China to

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<sup>66</sup>Eckstein, 1966, p. 249, Table 7-1.

Japan on the GNP dimension is calculated as

$$d_{\text{China} \rightarrow \text{Japan, GNP}} = 77 - 42 = 35 \text{ (billion dollars)}^{67}$$

In a similar fashion, we can calculate the distance from China to Japan on other attribute dimensions; population distance = -484 million, steel production distance = 17 million tons,<sup>68</sup> and so on. Field theory axiomizes that each of these distances are the components of the force vector that makes a nation behave in a certain way.

2) Next, the term  $\alpha_l$  is the weighting parameter of each attribute dimension. Each attribute distance may have a different impact on the decision-makers of different nations. For example, the Chinese may be very concerned about their economic distance from other nations, while regarding the religious distances (differences) as trivial. Each  $\alpha_l$  is the specific scalar weight for each of the different attribute distances.

3) The symbol  $\Sigma$  denotes that we need to sum all attribute distances (differently weighted) in order to calculate the resultant force which is exerted on the nation to determine her behavior.

4) Finally, the term  $v_{i+j,k}$  represents one of the elements of the vector of nation  $i$ 's behavior to  $j$  on the  $k$ -th behavioral dimension in  $B$ -space. In field theory, as we discussed above, the unit of

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<sup>67</sup>In actual research, both  $A$ - and  $B$ -spaces are factor analyzed, first. The factor scores are, then, used as the values of each unit on factor dimensions. Therefore,  $d$ , the distance between  $a_{i,l}$  and  $a_{j,l}$  measures the differences in factor scores. The "raw differences" are given here to clarify the concept of distance.

<sup>68</sup> Both figures are from the UN Statistical Yearbook, 1965.

nation behavior is defined as a dyad, a pair of nations, one of which directs her behavior toward another (with our notation  $i \rightarrow j$ , the nation  $i$  is the actor, and  $j$  is the receiver). For example, the fact that China gave 50 million dollars of economic aid to North Korea (1955) is expressed as

$$W_{\text{China} \cdot \text{N. Korea, economic aid}} = 50 \text{ million dollars}$$

Equation (1) given above is in scalar form. That means we take one general element from the left side and one from the right side and express the relationship between them, or in other words, the equation denotes only one dyadic relationship. If we express equation (1) in matrix (vector) form, i.e. for all  $m$  dyads, it becomes

$$W_{m \times 1}^k = D_{m \times p} P_{p \times 1} \quad (3)$$

where  $W_{m \times 1}^k$  is the  $k$ -th dimensional behavior vector of  $R$ -space which is composed of the same behavior of all  $m$  dyads;  $D_{m \times p}$  is the matrix of the distance vectors, each column of which represents an attribute distance vector for  $m$  dyads; and  $P_{p \times 1}$  is a set of  $p$  weighting parameters each of which correspond to an attribute vector.

The expanded form of this matrix equation is,

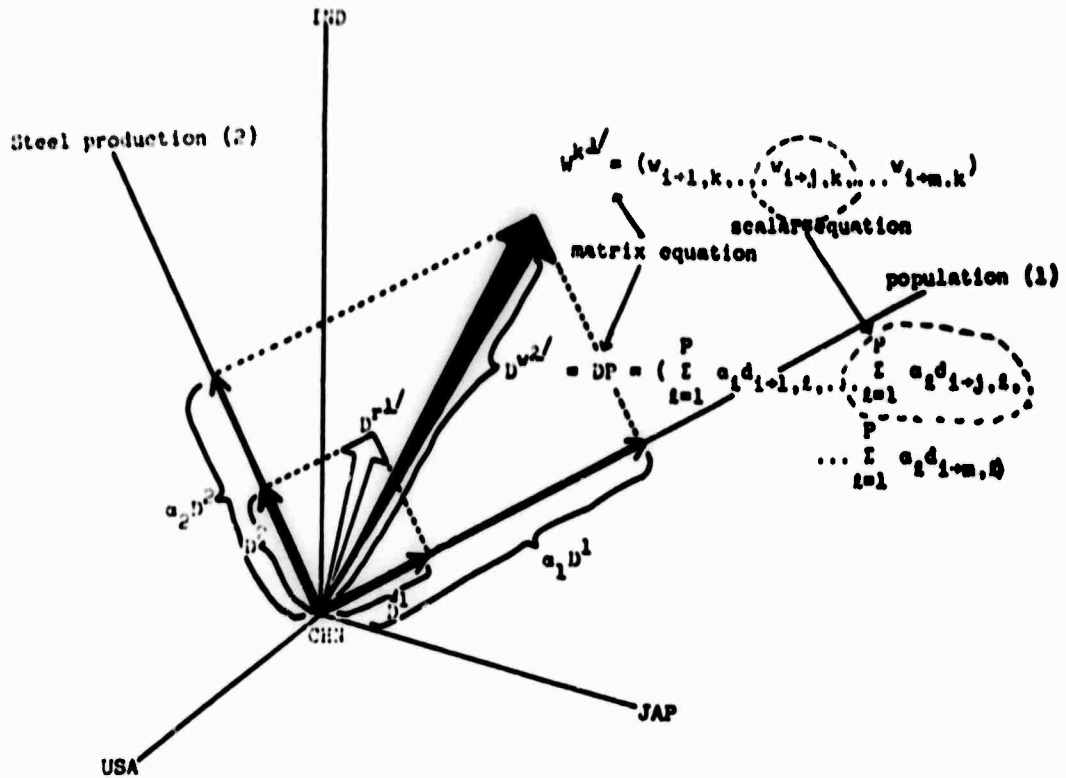
$$\begin{matrix}
 W_{m \times 1}^k & & D_{m \times p} & & P_{p \times 1} \\
 \left[ \begin{matrix} w_{i \rightarrow 1, k} \\ w_{i \rightarrow 2, k} \\ \vdots \\ w_{i \rightarrow j, k} \\ \vdots \\ w_{i \rightarrow m, k} \end{matrix} \right] & = & \left[ \begin{matrix} d_{i \rightarrow 1, 1} & \cdots & d_{i \rightarrow 1, \ell} & \cdots & d_{i \rightarrow 1, p} \\ d_{i \rightarrow 2, 1} & \cdots & & & \cdot \\ \vdots & & & & \cdot \\ \vdots & & & & \cdot \\ d_{i \rightarrow j, 1} & \cdots & d_{i \rightarrow j, \ell} & \cdots & \cdot \\ \vdots & & & & \cdot \\ \vdots & & & & \cdot \\ d_{i \rightarrow m, 1} & & d_{i \rightarrow m, \ell} & & d_{i \rightarrow m, p} \end{matrix} \right] & \left[ \begin{matrix} \alpha_1 \\ \alpha_2 \\ \vdots \\ \alpha_\ell \\ \vdots \\ \alpha_p \end{matrix} \right]
 \end{matrix} \quad (4)$$

$$= \alpha_1 \begin{matrix} D^1 \\ \left[ \begin{matrix} d_{i \rightarrow 1, 1} \\ d_{i \rightarrow 2, 1} \\ \vdots \\ d_{i \rightarrow j, 1} \\ \vdots \\ d_{i \rightarrow m, 1} \end{matrix} \right] \end{matrix} + \dots + \alpha_\ell \begin{matrix} D^\ell \\ \left[ \begin{matrix} d_{i \rightarrow 1, \ell} \\ d_{i \rightarrow 2, \ell} \\ \vdots \\ d_{i \rightarrow j, \ell} \\ \vdots \\ d_{i \rightarrow m, \ell} \end{matrix} \right] \end{matrix} + \dots + \alpha_p \begin{matrix} D^p \\ \left[ \begin{matrix} d_{i \rightarrow 1, p} \\ d_{i \rightarrow 2, p} \\ \vdots \\ d_{i \rightarrow j, p} \\ \vdots \\ d_{i \rightarrow m, p} \end{matrix} \right] \end{matrix}$$

where  $D^\ell$  is the  $\ell$ -th column vector of  $D$ . If we define  $D^W$  as the weighted resolution vector of  $D^\ell$  vectors where each  $D^\ell$  vector is weighted by corresponding  $\alpha_\ell$  weights, then,

$$W^k = D^W = \sum_{\ell=1}^p \alpha_\ell D^\ell \quad (5)$$

Geometrically, the basic equation of the field theory can be illustrated as in Figure 1. Here, the location of China's position is



1/  $D^r$  = resolution vector of  $D^l$

2/  $D^v$  = resolution vector of weighted  $D^l$  ( $a_l D^l$ ).

$$D^v = DP = a_1 D^1 + a_2 D^2 + \dots + a_l D^l + \dots + a_p D^p$$

Therefore, the first term of  $D^v$  is  $a_1 d_{1 \rightarrow 1, 1} + a_2 d_{1 \rightarrow 1, 2} + \dots + a_l d_{k \rightarrow 1, l} + \dots + a_p d_{1 \rightarrow 1, p} = \sum_{i=1}^p a_i d_{i \rightarrow 1, 1}$ , and the j-th term is  $\sum_{i=1}^p a_i d_{i \rightarrow j, l}$

3/  $W^k$  = k-th vector of  $W$ . The j-th element of  $W^k$  is  $v_{i \rightarrow j, k}$ .

FIGURE 1

GEOMETRIC EXPRESSION OF THE BASIC EQUATION OF FIELD THEORY

taken as the origin of the coordinates. (In general, any point in attribute space may be chosen as the origin. The relative distances among all nation points are not affected by choice of origin.) There are  $q$  dimensional vectors in  $W$  and each of them are related to  $D^W$  in the form of equation (5). If we express all the equations as a single equation, we would have

$$W_{mxq} = D_{m \times p} P_{p \times q} \quad (6)$$

where  $W_{mx1}^k$  is one of the column vectors ( $k$ -th vector) of  $W_{mxq}$ .

### 3.4.2 Field Theory Model I and Model II

There are two different models developed by Kummel according to the different interpretations for weighting the parameters. In Model I, the parameters are universal, i.e., the same across all the actors. This implies that the unique experiences and capacities of each nation and the structures within them are irrelevant to her behavior. In other words, a nation's responses to the various kinds of distances are the same as all other nations. Furthermore, it implies that the behavior of nation  $i$  to  $j$  is the exact opposite of the behavior of nation  $j$  to  $i$ . This obviously contradicts common sense.<sup>69</sup>

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<sup>69</sup>"Recall that a distance vector for nations  $i$  and  $j$  is a difference. Thus, when we reverse  $i$  and  $j$  we only reverse the sign on the distance vector. Then, the behavior of  $i$  to  $j$  will only differ from  $j$  to  $i$  in the sign, and not the absolute value (Kummel, 1969b, p. 18)."

In Model II, the parameters are unique to each actor nation. This model allows the impact of each of the attribute distances on behavior to differ according to each nation. This is the point where each nation's intelligence can be geared in. Thus, for example, although China's attribute distances from other nations are the same as India's, the impact of these distances on her foreign policy will differ from India's, due to her unique perceptual framework. For this reason, Model II is preferable to Model I. In Model II, the equation that links behavior and attribute difference is,

$$w_{i \rightarrow j, k} = \sum_{l=1}^n \alpha_{il} d_{i \rightarrow j, l} \quad (7)$$

Here,  $\alpha_{il}$  has replaced  $\alpha_l$  in the equation of Model I, equation (2).

In matrix form, the equation is

$$W_{mx1}^k = D_{m \times n} P_{px1}^i \quad (8)$$

and for all  $q$  behavioral vectors together,

$$W_{mxq} = D_{m \times n} P_{pxq}^i \quad (9)$$

where  $P_{px1}^i$  and  $P_{pxq}^i$  are unique weighting parameters which represent each nation's idiosyncratic decision-making system. For convenience the superscript  $i$  will be dropped, since this study will deal with only one actor, China,  $P_{pxq}$  can denote  $P_{pxq}^{\text{China}}$  without any confusion.

Then, the complete model with error matrix U inserted will look like

$$W_{mxq} = D_{m xp} P_{pxq} + U_{mxq} \quad (10)$$

Hereafter, when I refer to field theory, it will be Model II, if not specified otherwise.

### 3.4.3 The Multiple Regression Model and the Canonical Regression Model

Now let us turn our attention to the behavior vector in B-space which is supposed to be related to the resolution vector of the individually weighted attribute distance vectors of A-space ( $D^W$ ).

Axiom 5 states that "the distance vectors in A-space that connect nations are social forces determining the location of dyads in B-space." Mathematically this axiom tells us only that distance vectors in A-space are functionally related to the behavioral vectors in B-space, but does not specify how these two kinds of vectors (or the two spaces) are related. How this is done, therefore, depends upon our intuitive interpretation of the nexus under the guidance of the overall philosophy of field theory. Among many possible interpretations, I will discuss two; Rummel's original formulation and an alternative.

Rummel's original formulation was given above in equations (7) and (8). This relates the resolution vector of attribute distances ( $D^W$ ) to the k-th dimensional vector of B-space ( $w^k$ ). In this formulation, the same matrix  $D^W$  weighted with different sets of weighting parameters,  $P^1, P^2, \dots P^k, \dots P^q$  is linked to each of the behavioral vectors in B-space respectively, namely,  $w^1, w^2, \dots w^k, \dots w^q$ . The model, however, has nothing to do with the interrelationship among the

behavioral vectors. Equation (10),  $W_{mxq} = D_{m \times p} P_{p \times q} + U_{mxq}$ , is therefore, a mere aggregation of  $q$  separate vector equations (multiple regression equations).

Theoretically, this formulation would tell us that a particular behavior (*e.g.* negative communication) is explained by a certain subset of attribute distances (*e.g.* GNP, political distances, etc.), while another behavior (*e.g.* economic aid) is mainly explained by another set of distances (*e.g.* number of Communist party members, steel production, etc.) without specifying the interrelationships between these individual behaviors (*e.g.* negative communication and economic aid).<sup>70</sup>

In this model, the weighting parameters  $P$  may be understood as the actor's unique "decision-framework" which represents the combination of both the perceptual framework and the system of behavioral choice, since this is the only set of parameters by which the actor's idiosyncrasy may be expressed.<sup>71</sup>

Geometrically, the relations between each of  $W^k$  and  $D^W$  may be illustrated as in Figure 2.

When we apply this model to an empirical study, we need to evaluate the  $P$  matrix of equation (10). Since this model requires an analysis of the relations among a single criterion measure ( $k$ -th

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<sup>70</sup>If we use the orthogonal basis dimensions rather than the raw behavioral vectors, this orthogonality gives meaningful interrelationships among these separate equations, *i.e.*, they are mutually independent. In this case, notice that the relationships are specified by the intrinsic characteristics of the basis, but not by the model.

<sup>71</sup>This distinguishes this model from the canonical model where perceptual and behavioral frameworks are separated and represented by different parameters. See Chapter 1 and the next part of this Chapter.

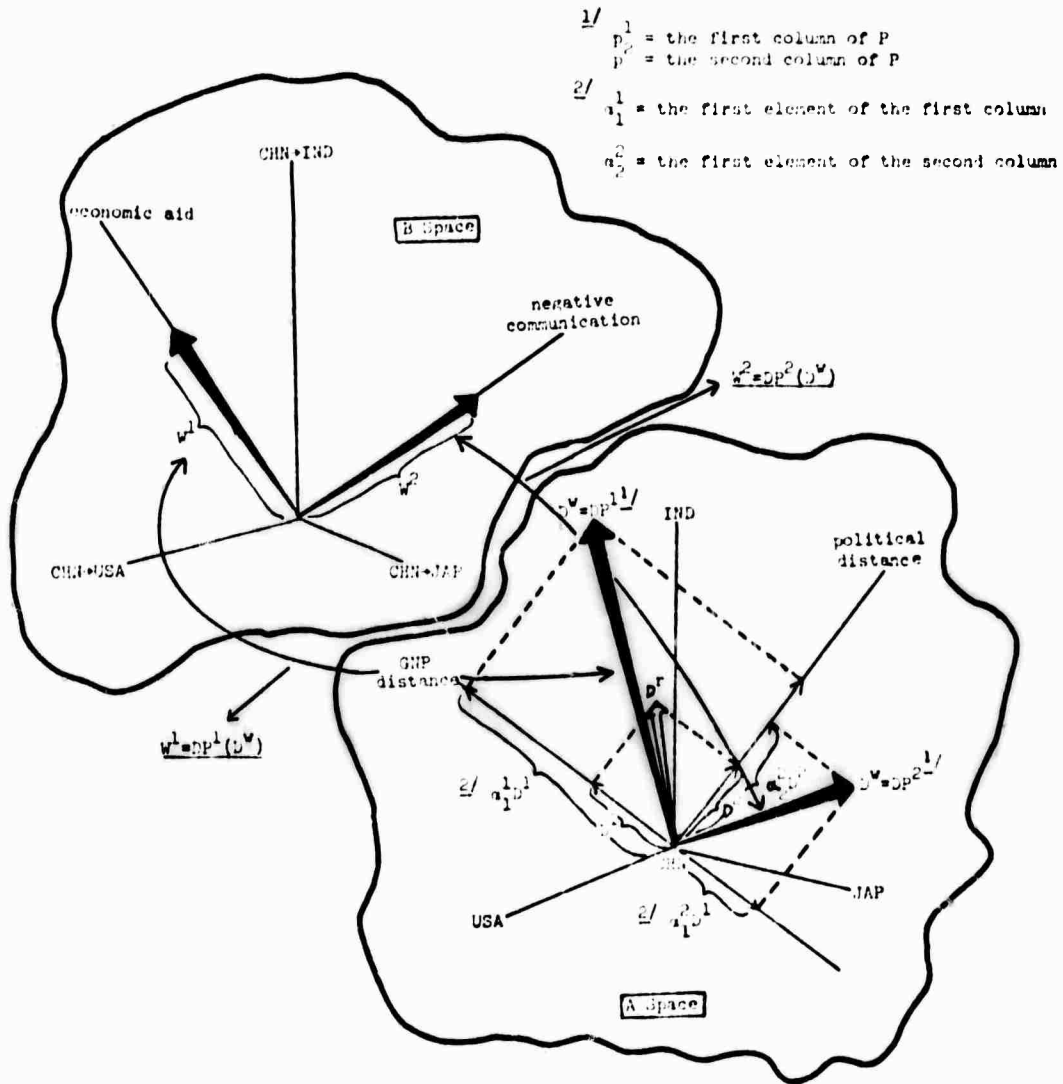


FIGURE 2

GEOMETRIC ILLUSTRATION OF MRM  
 (MULTIPLE REGRESSION MODEL) OF FIELD THEORY

behavioral vector) and two or more predictor measures ( $p$  attribute distance vectors), we can evaluate the values of  $P$  employing the least-squares estimation technique, a standard solution of a multiple regression model which assures us of finding the best unbiased estimate of  $W^k$ .<sup>72</sup> Hereafter, I will call this formulation (equation 10) the Multiple Regression Model of Field Theory (MRM).

Technically, however, this model (MRM) created a problem. In this study, I sought: first, to determine a set of attribute indicators that best account for China's foreign behavior, and second, to "assess the empirical fit of B-space to A-space."<sup>73</sup> The first goal could be achieved with the MRM, since the estimate of  $W$  by  $P$  which is evaluated through the least-squares technique is the best unbiased estimate of  $W$ .<sup>74</sup>

In assessing the maximum fit between A- and B-space, however, there was a problem. With the MRM, to judge the fit between the two spaces, we measure the proportion of variance in B-space accounted for by A-space. If  $q$  variables of  $W$  are mutually orthogonal, then the 'trace correlation squared' ( $\bar{r}^2$ ), which is the mean variance of  $q$  behavioral variables in  $W$  accounted for by corresponding  $q$  estimate of the variables ( $\hat{W}^k$ ), can measure the fit, since  $\bar{r}^2$  has the largest

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<sup>72</sup>For the conditions and mathematical derivations for the solution of the multiple regression model, see Johnston, 1963, pp. 108-115, and Cooley and Lohnes, 1962, pp. 31-35.

<sup>73</sup>These two goals are the same as Rummel's. See Rummel, 1969b, p. 22.

<sup>74</sup>If the  $m$  dyads are a random sample from a multinormal universe. Rummel, *loc. cit.*

value for orthogonal  $W$  when  $W^k$  is estimated through the least-squares method. The equation for  $\overline{r^2}$  is

$$\overline{r^2} = \frac{1}{q} \sum_{k=1}^q \left( \frac{1}{m} \sum W^k, \hat{W}^k \right)^2 \quad (11)$$

or in general

$$\overline{r^2} = \frac{1}{qm^2} \text{tr}\{(W'W)'(W'\hat{W})\} \quad (12)$$

where "tr" is the sign for summation of the diagonal elements of the matrix.

The problem was that empirically we could not expect the variables of  $W$  to be orthogonal, nor does field theory constrain them to be orthogonal; only linear independency is required. Therefore, the mean correlation squared of all multiple correlations between  $W^k$  and  $D^W$  may not be the largest possible trace correlations squared between A- and B-spaces.

If we are interested in assessing the maximum fit between two spaces and not in reproducing the best estimated value of individual behavior variables, then we can start the analysis with any of the orthogonal basis of  $W$  instead of the raw variables. For example, if we factor analyze the  $W$  space with the varimax rotation criterion, we can find a basis of  $W$ , whose dimensions are mutually orthogonal and whose trace correlation with  $D^W$  is the maximum when we regress each of the behavioral basis dimensions onto  $D^W$  individually. But in this case, there is another problem.

A basis is not unique. Theoretically, there may be an infinite number of bases of  $W$ , all of which have the same maximum trace correl-

ations with  $D^W$ , because we can rotate any basis of  $W$  by any linear transformation without altering its inner structure (inter-dimensional relationship). For different bases, however, the distribution and magnitude of correlations between each component behavior vector and  $D^W$  will vary from one basis to another. Therefore, we need one more restriction on the model which will determine the basis that would find the  $W^k$  which is best accounted for by the distances.

I solved this problem by making a simple modification of the interpretation of Axiom 5 in Rummel's original model. Instead of relating the  $W^k$  vector of  $B$ -space to  $D^W$  of  $A$ -space, I related  $W^W$ , the weighted resolution vector of  $q$  dimensions of  $W$ , to  $D^W$ . The scalar equation of the new model, then, is

$$\sum_{k=1}^q \beta_{ik} w_{i \rightarrow j, k} = \sum_{l=1}^p \alpha_{il} d_{i \rightarrow j, l} \quad (13)$$

where  $\beta_{ik}$  is the weighting parameter of the  $k$ -th behavioral dimension of  $W$ . In matrix form, the equation is

$$W_{mxq} Q_{qx1} = D_{mxp} P_{px1} \quad (14)$$

where  $Q_{qx1}$  is the matrix of  $\beta$  parameters for all  $q$  dimensions.

Technically, what I have done is to form a composite variate ( $V$ ) out of  $p$  distance dimensions of  $D$ , weighting each  $p$  dimension by  $P$ , and another composite variate ( $Y$ ) out of  $q$  dimensions of  $W$ , weighted by  $Q$ , and, then, relate these two composite variates. Geometrically, the relationship between the two variates is illustrated in Figure 3.

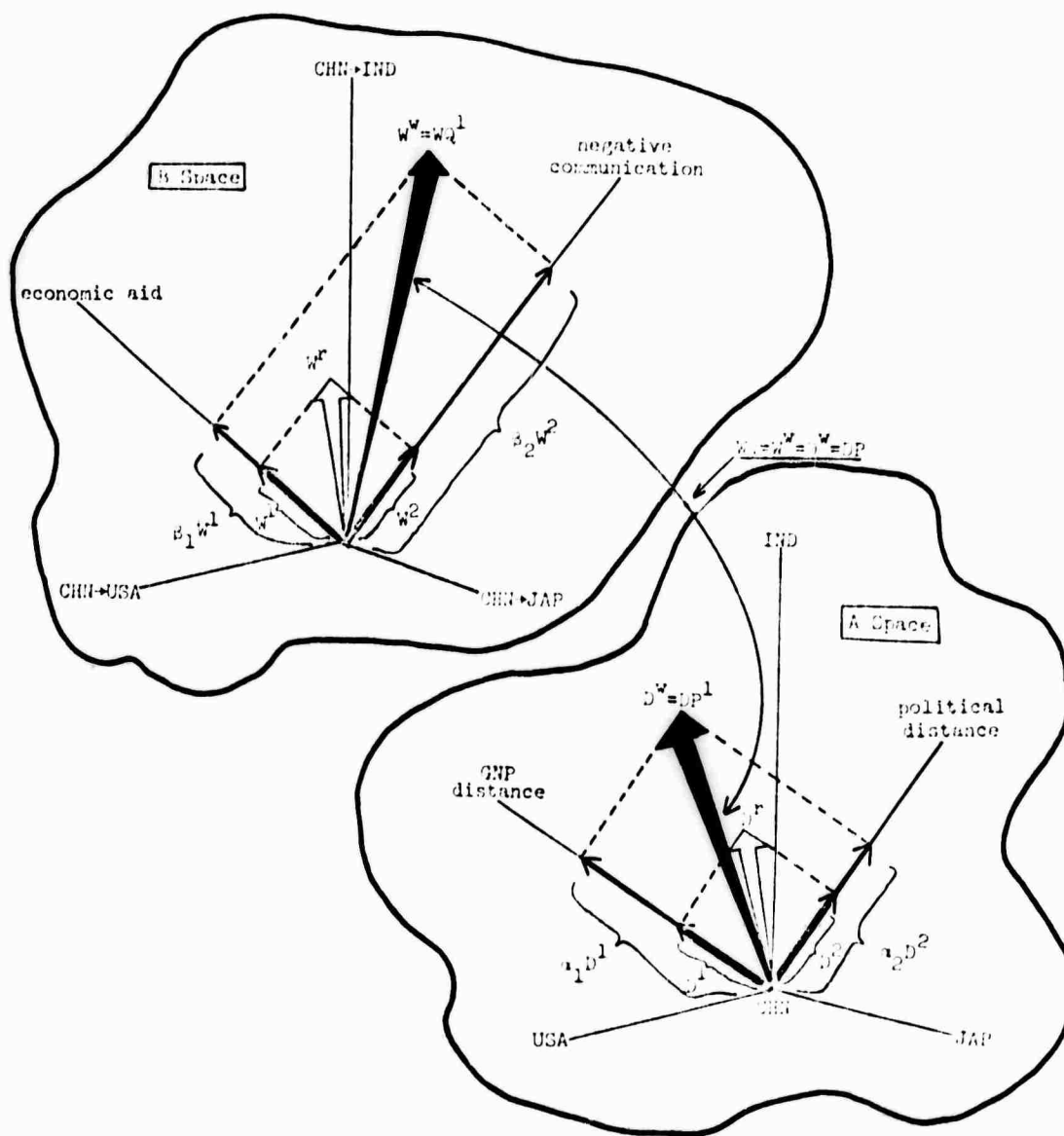


FIGURE 3

GEOMETRIC ILLUSTRATION OF CRM  
(CANONICAL REGRESSION MODEL) OF FIELD THEORY

Theoretically, with this model, the parameters of P are the actor's unique perceptual framework of attribute distances,<sup>75</sup> which is formulated by her historical background, value system, cultural heritage, etc., and the parameters of Q the unique behavioral framework or system of behavioral choice which gives different emphasis on each behavior when given forces are applied.

To apply this model to China's behavior, we must evaluate both P and Q empirically, or solve Q and P of the following equation

$$WQ = DP + U \quad (15)$$

or

$$Y = V + U \quad (16)$$

where W and D are known, and U is the random error uncorrelated with any of the variables in D.

A solution is possible if we put the following restrictions on the equation<sup>76</sup>

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<sup>75</sup>Note that by "unique" perceptual (or behavioral) framework, it is not meant that an actor has only one universal screening framework for differentiating the relative potency among various distances. It means that an actor has a set of frameworks, each of which is for a particular behavior pattern. For example, to determine the intensity of negative communication toward an object nation, the actor may value the power distance most heavily, while for a trade behavior, it may show highest sensitivity to the distance in economic development. If we use canonical regression analysis to delineate these unique perceptual (and behavioral) frameworks, we shall have q sets of different unique perceptual frameworks, where q is the dimensionality of B-space.

<sup>76</sup>See Rummel, 1969b, p. 24.

$$\begin{aligned} Y'_h V_g &= \text{maximum correlation when } h = g \\ Y'_h V_g &= 0, \text{ when } h \neq g \\ Y'_h Y_h &= V'_h V_h = 1 \end{aligned} \tag{17}$$

The equation (15) with restrictions (17) is the canonical regression model<sup>77</sup> and we can solve for the best fitting  $Y$  and  $V$  from  $W$  and  $D$  employing canonical analysis. Then " $V(=DP)$ " will give the parameters of  $P$  best in the sense of minimizing  $U$ , and  $Y(=WQ)$  will give the behavior dimensions of  $B$  having the best correlations with attribute differences  $D$ .<sup>78</sup>

The canonical analysis gives us  $q$  different canonical equations,<sup>79</sup> each of which maximizes the correlation between the paired canonical variates ( $Y_h$  and  $V_g$ ) under the restriction that each pair is orthogonal to all other pairs. In other words, the first canonical equation gives the highest possible correlation between the first composite score (variate) of distances ( $V_1$ ) and the first composite variate of behavior ( $Y_1$ ). The second equation gives the next composite variate of distances ( $V_2$ ) and behavior ( $Y_2$ ) which maximizes the correlations of the remainder of the total variances (the unexplained portion of the variances which is independent of those explained by the first

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<sup>77</sup>For the model of canonical regression and its mathematical derivations, see Hotelling, 1935, Hooper, 1959, Cooley and Lohnes, 1962, Anderson, 1958, and Glahn, 1969.

<sup>78</sup>Rummel, *op. cit.*, p. 24.

<sup>79</sup>The number of pairs of canonical variates which come out from a canonical analysis is  $q$  or  $p$ , whichever is the smaller. Axiom 7 tells us that  $q \leq p$ .

canonical equations) after the first equation had explained as much as possible, and so on for the third to q-th equations.

Then how can we fit this model to our reality? I interpreted the model in the following way: The whole decision space of the decision-makers, which includes both the inputs (targets of perception; here these are attribute distances between the decision-maker's nation and other nations) and outputs (decision result; behavior), may be decomposed into many subspaces or substructures of the decision process. For example, for military aid to other nations Chinese decision-makers would consider mainly economic distances and political systems rather than literacy rates, language difference, and catholic population. In determining behavior concerning student exchange, however, language difference, and technical distances may emerge as major considerations. Here we may say that the first pattern of relations is a political subset of the behavior structure while the latter constitutes a cultural subset.

Each substructure of the behavior pattern is represented by each of the canonical equations of the model. In this sense, equation (14) is one of the subsets of the whole model which contains q number of subsets. We, then, can express the general model of CRM in the following form,

$$W_{mxq} Q_{qxq} = D_{mxp} P_{pxq} + U_{mxq}. \quad (18)$$

I called this new model the Canonical Regression Model (CRM) of field theory.<sup>80</sup>

As discussed above, the MRM has one decision framework and the CRM has two--perceptual framework and behavioral system--and this means that the decision framework in the MRM is decomposed into two separate systems in the CRM.

The CRM, however, has one theoretical disadvantage compared to the MRM. In evaluating Q and P, the solution under the standard restrictions of the canonical analysis maximizes only the correlation between the composite canonical variates of both W and D; each individual behavior variable is identifiable only as it contributes to the particular variate. Also, the solution does not assure us of finding the maximum correlation between individual behavior and distances. Therefore, the CRM is not an adequate model to be applied if we are interested in reproducing the raw values of each of the behavioral variables which has the maximum multiple correlations, with the set of distances.

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<sup>80</sup>Technically speaking, the MRM is a special case of the CRM where all B coefficients except for one, the k-th parameter  $\beta_k$  are zeros. In other words, if we give another restriction,  $\beta_k = 0$  if  $k \neq$  number of the equation, and  $\beta_k = 1$  if  $k =$  number of the equation, then equation (13) will degenerate into

$$w_{i \cdot j, k} = \sum_{l=1}^p a_{l k \cdot j, l} d_{k \cdot j, l}$$

which is the multiple regression model. This is only true when W and D are orthogonal matrices. If we use factor scores (obtained from the orthogonal varimax rotation) instead of raw data, W and D are orthogonal.

Since I wished both to find China's unique system of perception of attribute distances and preference of behavior, and to predict the actual value of behavioral variables, I used both models. To delineate China's unique foreign policy structure (behavior pattern), the CRM was better than the MRM, while to calculate the best estimated real value of a specific behavior in the future, the MRM was better. A detailed strategy for the utilization of both models will be discussed in the next chapter.

#### 3.4.4 Theoretical Implication of the Empirical Model

In order to develop an empirically applicable model for Communist China's foreign behavior, I interpreted the P and Q of field theory Model II as Chinese decision-makers unique perceptual and behavioral frameworks, respectively, which are invariant across time. Then, I designed the P and Q to be evaluated from the empirical data.

Thus, theoretically, what I have done is that to the analytic skeleton of field theory, flesh of substantive contents were given empirically. In field theory, the postulated form of the relationship between behavior (W) and attribute distances (D) is a linear function. The P and Q, then, are to be evaluated to maximize the linear fit between the two spaces.

As I mentioned earlier, however, the theory does not postulate the quantities of the P and Q substantively. These are left to be evaluated with empirical data. Therefore, the theory implies that the nature of linearity between A- and B-spaces is invariant over time, but it does not imply that the actual figures of the P and Q are also

invariant. In field theory, the P and Q may vary across time, because the D and W will change over time, and the parameters that maximize correlations of different data sets may be different.

By interpreting the P and Q as invariant systems of perception and behavior, however, I add one extra-model restriction on the nature of the P and Q (to be invariant across time). In this sense, the "interpretation" actually creates a sub-theory within the field theory framework by adding one more constraint on the nature of the P and Q.

## CHAPTER IV

### RESEARCH DESIGN

The goals of this study, as discussed in the introduction, were first, to test field theory with data for China's foreign behavior, and second, to uncover China's unique behavioral patterns by evaluating P and Q of the field theory Model II equation. The second goal can be fulfilled by obtaining equations that link foreign behavior patterns to attribute distances in ways unique to China. Then, this pattern relationship between behavior and distances can be used to predict the values of the behavioral variables for China in the future. What follows is the design I used to achieve these goals.

#### 4.1 The Bases of A- and B-Spaces

Field theory is formulated in terms of the basis dimensions of A- and B-spaces (see 3.3 Axiom 3 in conjunction with Axiom 5). Furthermore, in this study, the models of China's behavioral pattern are formulated in the forms of canonical structure equations. Although the canonical regression model does not require orthogonality among variables, to eliminate the effect of interaction among the variables (basis dimensions) in canonical analysis the basis dimensions must be orthogonal, because intercorrelated variables will mix the contribution of each individual variable to the variate scores with the joint effect of the correlated variables. To meet these requirements, both A- and B-space data were factor analyzed employing the principal component

technique,<sup>81</sup> and orthogonally rotated with the varimax criterion.<sup>82</sup> The resultant orthogonal factors of the data matrices are the bases of the two spaces. The basis of B-space thus delineated is W and that of A-space D in the CRM (equation 18).<sup>83</sup>

#### 4.2 Factor Comparison

If field theory is valid, the proposed linear linkage between A- and B-space bases should be unchanged across time. Thus, the theory was tested twice, first with 1955 data and then with 1963 data. Then, the results of both analyses were compared using various statistical techniques (see 4.3 and 4.4 below).

The comparison, however, requires the same (at least similar) structure for the spaces (both D and W) across the two time points, *i.e.*, D in 1955 and D in 1963 must have the same factors as does W. The requirement of identical factors across time is crucial in formulating an empirically applicable model for China's foreign behavior, with which the actual scores of future behavior variables are supposed to be forecast.

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<sup>81</sup>For definition and solution of the principal component analysis technique, see Rummel, *ibid.*, pp. 338-345 (4.3.4).

<sup>82</sup>Rummel, *ibid.*, pp. 391-393.

<sup>83</sup>Factor scores of the basis dimensions were used in the W and D matrices. For computation, "The Modular Factor Analysis Package," newly programmed by Charles Wall is used. This package is available at the Dimensionality of Nations Project, University of Hawaii.

In this study, the factors of 1955 space (both A- and B-) were compared to those of 1963 space with Ahmavaara's transformation technique.<sup>84</sup> To compare the factors of two matrices (D-1955 and D-1963; W-1955 and W-1963), first the loading matrices of the D-1963 and W-1963 ( $\hat{F}_2$ ) were estimated from the factor loading matrices of the first analyses, D-1955 and W-1955 ( $F_1$ ) employing the following formula:

$$\hat{F}_2 = F_1 L, \text{ where } L = \{(F_1' F_1)^{-1} F_1' F_2\}.$$

The product-moment correlation between  $F_2$  and  $\hat{F}_2$  served as an indicator of similarity between the two spaces.<sup>85</sup> Also, correlations between each pair of corresponding factors in two time points were calculated to see individual similarities among variables.<sup>86</sup>

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<sup>84</sup>See Ahmavaara and Markkanen, 1958, pp. 80-83.

<sup>85</sup>The correlation is calculated between two super column vectors, produced by connecting all columns in the matrix one after another (the top of the second column is placed below the bottom of the first column, and so on). Computation was done with Wall's "Modular Factor Comparison Program," which is also available at the Dimensionality of Nations Project, University of Hawaii.

<sup>86</sup>The same computation program by Wall given in footnote 85 is used.

### 4.3 Multiple Regression Analysis

To test the MRM of field theory, each of the behavior vectors were regressed on all vectors of D. Then, the predicted value ( $\hat{W} = DP$ ) was correlated with the observed value (W).<sup>87</sup> This correlation indicated the fit of the model to the data.

### 4.4 Canonical Regression Analysis

From the CRM model (equation 18), taking W to be dependent and D to be independent, a canonical regression analysis was performed. This analysis gave us two kinds of matrices.

The first matrix is the regression coefficients, the  $\alpha$ 's and  $\beta$ 's of the CRM, which are the weighting parameters of each of the dimensional vectors which maximizes the canonical correlation between each pair of canonical variates ( $Y_1$  and  $V_1$ ,  $Y_2$  and  $V_2$ , ... and so on).<sup>88</sup> These regression coefficients allow us to formulate q number of relational equations

$$\begin{aligned} & \beta_1 W^1 + \beta_2 W^2 + \dots + \beta_k W^k + \dots + \beta_q W^q \\ & = \alpha_1 D^1 + \alpha_2 D^2 + \dots + \alpha_l D^l + \alpha_p D^p + e \end{aligned} \tag{19}$$

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<sup>87</sup>The correlation between W and  $\hat{W}$  is calculated as if all vectors in both matrices form one long column vector each, the first vector being connected to the top of the second vector, and so on. In this way we can get a single measurement of fit between the two matrices. For computation, the "Modular Factor Comparison Program" (footnote 85) is utilized.

<sup>88</sup>There will be q sets of canonical variates, where q is the dimensionality of W.

where  $e$  is random error. Each of these equations represents each sub-set of China's behavior pattern discussed in Chapter 3. Let us call this the canonical regression coefficient matrix ( $C_r$ ).

Another matrix obtained from the canonical analysis is a canonical loading matrix, which contains correlations between the canonical variates and the original variables.<sup>89</sup> Therefore, each of the elements of this matrix, when squared, gave the proportion of variance in  $Y_h$  and  $V_g$  accounted for by the corresponding dimensions. Utilizing this knowledge of the contribution of individual dimensional variables in constituting canonical variates, we can see the pattern structure of China's behavior; which distances are related to which behavior. If we define the loadings of  $W^k$  on  $Y_h$  as  $b_{kh}$ , and the loadings of  $D^l$  on  $V_g$  as  $a_{lg}$ , then we can construct the following structure equations,

$$\begin{aligned}
 & b_{1h}W^1 + g_{2h}W^2 + \dots + b_{kh}W^k + \dots + g_{qh}W^q \\
 & + a_{1g}D^1 + a_{2g}D^2 + \dots + a_{lg}D^l + \dots + a_{pg}D^p
 \end{aligned} \tag{20}$$

where  $g = h$ , and the arrow means "relatedness" between the two combinations. Each of these equations will tell us which attribute distances are important in explaining a specific combination of behaviors. Let

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<sup>89</sup>On the left hand side, the correlations are between  $W_h^k$  and  $Y_h$ , and on the right hand side, between  $D_g^l$  and  $V_g$ , where  $W_h^k$  is the value of  $W^k$  in the  $h$ -th canonical equation,  $D_g^l$ , the value of  $D^l$  in  $g$ -th canonical equation.

us call this the canonical structure matrix ( $C_g$ ). As we shall see later, both equations, (19) and (20), served to uncover the patterns of China's foreign behavior.

The following four statistics were utilized to measure the degree of fit between the model and data.

canonical correlation ( $r$ ): This is the correlation between  $Y_h$  and  $V_g$ , where  $h = g$ . There is  $q$  number of canonical correlations, because in this study  $q$ , the dimensionality of B-space, is less than  $p$ , that of A-space. The canonical correlation, when squared, tells us the proportion of the total variance accounted for by the pattern, and will measure the salience of the pattern.

trace correlation squared ( $\bar{r}^2$ ): The formula for calculating the trace correlation squared was given as equations (11) and (12). The  $\bar{r}^2$  gives the proportion of overall variances in  $W$  accounted for by the model ( $\hat{W} = DP$ ). To see the overall fit between A- and B-spaces, therefore, this statistic is an adequate measurement.

standard deviation of differences between estimated and observed behavior scores: The canonical variate is a hypothetical composite variable of all the dimensional vectors of distances and behavior, which are patterned by unique weighting parameters. If the patterns of behavior and of attribute distance vectors fit perfectly, the two canonical variates should be equal. This means that we can predict the behavior pattern perfectly from the pattern of attribute distances. Therefore, the magnitude of the differences between the two canonical variate scores--the actual canonical variate scores and those estimated

from the distance pattern--is a good indicator of the fit of the model. The standard deviation of the errors--the remainder after subtracting the estimated scores--can be used as a benchmark for the degree of fit of the model to the data.

communality estimate (H-SQ): In equation (20), if we square each of the loadings and sum them together for each side ( $\sum_{k=1}^q b_k^2$  and  $\sum_{l=1}^p a_l^2$ ), we will have another statistic called communality estimates. This statistic tells us the proportion of the variance in each variable contained in the pattern represented by equation (19). The sum of the squared communality over all factors in A-space, then, will tell us the proportion of variance in the space accounted for by the pattern.<sup>90</sup> If the H-SQ of distance in one pattern is low, this means little relation between the component variables and the pattern. If very high, it indicates that most of the variables are identified with the model. If we weight this H-SQ and corresponding H-SQ of B-space vectors (the same across all variates) by the ratio of numbers of vectors involved, then, we have the proportion of the total variance represented by equation (19). This statistic will, therefore, tell us the inner structures of the patterns, as well as the relative importance of the patterns in terms of the amount of variance accounted for.

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<sup>90</sup>The communality estimates (H-SQ) of behavioral vectors will always be 1.00, since B-space is smaller than A in dimensionality. Therefore, only the H-SQ of distances is meaningful for interpretation. See Phillips and Hall, 1968, p. 12.

#### 4.5 Test of Applicability of the Models

If field theory is valid and the derived models can be applied to explain and predict Communist China's foreign behavior, then, we also should be able to forecast China's future behavior with the models.

The simplest test of the applicability of the models, therefore, is to compare the scores of each variable at some future time point forecast by the model with the observed scores. In this study, the tests were performed with the 1963 data in two different ways.

##### (1) Forecasting Values of Each Individual Behavior

In the first place, the scores of each individual behavioral factor of 1963 were forecast from the 1955 model. In the model, all dyadic behavior is measured in terms of the rotated factor scores of the basis dimension in B-space. In A-space, attribute distances are measured also in terms of factor score difference of the rotated basis dimensions of the space. Thus, what is forecast are the factor scores of each individual factor.

In this study both behavioral models (MRM and CRM) are built with the basic assumption that the decision framework of one nation will be unchanged over time. This means that the relative importance of the various attribute distances to the decision-maker's perception, as well as the preference pattern for the choice of foreign behavior by the decision-maker is invariant, though actual distances may change over time.

Thus, the test of the model is actually the test of the invariant nature of the perceptual and behavioral frameworks of the

decision-makers (in MRM, the two frameworks are geared into one decisional framework).

In this study, the test was performed with the 1963 data. First, P, the perceptual framework of Chinese decision-maker, and Q, the behavioral preference system (in MRM, P only) were calculated from the analyses of the 1955 data. Then, applying these P and Q of 1955 to D of 1963, the W of 1963 was calculated ( $\hat{W}_{63}$ ). The comparison of the  $\hat{W}_{63}$  to  $W_{63}$ , the observed scores, is a test of the applicability of the models.

The forecasting equation for the MRM is the same as the original MRM equation (equation 10) with exception of the P of 1963, which is replaced with the P of 1955.

For the CRM, however, Q on the left-hand side of the original model (equation 18) is moved to the right-hand side. The original model was

$$W_{mxq} Q_{qxq} = D_{mxp} P_{pxq} + U_{mxq} \quad (18)$$

Post-multiplying both sides of the equation by  $Q'_{qxq}$ ,<sup>91</sup> we get

$$W_{mxq} Q_{qxq} Q'_{qxq} = D_{mxp} P_{pxq} Q'_{qxq} + U_{mxq} Q'_{qxq} \quad (21)$$

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<sup>91</sup>In this study, the actual Q matrix was found to be a non-singular square matrix, and  $\hat{W}$  was calculated by post-multiplying both sides by  $Q^{-1}$  directly. The equation was  $W_{mxq} = D_{mxp} P_{pxq} Q_{qxq}^{-1}$

Post-multiplying both sides by  $(Q_{qxq} Q'_{qxq})^{-1}$  again,

$$W_{mxq} = D_{mxp} P_{pxq} Q'_{qxq} (Q_{qxq} Q'_{qxq})^{-1} + U_{mxq} Q'_{qxq} (Q_{qxq} Q'_{qxq})^{-1} \quad (22)$$

If we replace P and Q of 1963 with those of 1955, then, our forecast  $W(\hat{W})$  is

$$\hat{W}_{mxq} = D_{mxp} P_{pxq} Q'_{qxq} (Q_{qxq} Q'_{qxq})^{-1} \quad (23)$$

To measure the goodness of fit between W and  $\hat{W}$  in both models, the product-moment correlations between each pair of corresponding vectors of W and  $\hat{W}$  was calculated. The mean value of all correlations also was calculated to see the overall fit (trace correlation equivalent).

In this study, the overall fit of the forecast values ( $\hat{W}_{63}$ ) from CRM must be equal to those from MRM, since we are using rotated basis dimensions produced with varimax rotation criteria, instead of raw variables.

The rotated basis dimensions are principal components of the space, and in MRM, we regressed each of these mutually orthogonal principal axes on the set of attribute distances. In CRM, through canonical regression procedure, we also rotated the factors of B-space to generate a set of orthogonal basis dimensions of the space (principal axes) which were projected into A-space such that each of the axes should have the maximum correlation with each of the rotated basis dimensions (principal axes) of A-space (the B-space basis dimensions projected into A-space are canonical variates of B-space, and

the corresponding A-space basis dimensions are those of A-space). Therefore, the only difference between the two models--MRM and CRM--was that, in MRM, the rotation of the B-space basis was done externally with separate factor rotation, while in CRM, the rotation was performed internally as a part of the canonical regression analysis. But if we had used intercorrelated raw behavior vectors, the results must have been different.

## (2) Forecasting Pattern Scores

In CRM, the behavioral pattern comprises more than two behaviors in the form of a linear combination. The overall pattern scores, which are the weighted sum of the scores of the behaviors involved in the pattern, then, is the canonical variate scores.

For example, if a specific pattern of Chinese foreign behavior is found as .80 trade + .50 negative communication, and supposing that for a particular dyad, China→Japan, the factor scores of trade is 2.00 and, for negative communication the dyad has the value of 1.00, then the overall pattern score of this particular behavioral pattern for China→Japan will be  $.80 \times 2.00 + .50 \times 1.00 = 2.10$ .

The forecasting of this pattern score with CRM was done with 1963 data. First, the P was calculated from the analyses of the 1955 data ( $P_{55}$ ) which then weighted the distances in 1963 ( $D_{63}$ ). The results ( $D_{63}P_{55}$ ), then were our forecast canonical variate scores, or the pattern scores of behavioral patterns in 1963 ( $\hat{W}_{63}$ ). These scores were compared to the observed behavioral pattern scores (canonical variate scores) in 1963 ( $W_{63}$ ) using the 1963 weights ( $Q_{63}$ ).

Again product-moment correlations between each corresponding pair of canonical variate scores--forecast and observed--were calculated to measure the goodness of fit of the model to the data. The mean value of the squared correlations (trace-correlations) gave the overall fit.

## CHAPTER V

## VARIABLES AND DATA

## 5.1 The Population

In 1955, there were ninety-nine independent nations in the international system, and in 1963, there were one hundred and thirty-nine.<sup>92</sup> For this study, all smaller nations (population less than 500,000) and those which did not exist as independent nations at either time points have been deleted,<sup>93</sup> leaving eighty-two nations for which data were collected. These nations are listed in Table 1.

## 5.2 Variables

In this kind of study, there are no standard criteria for the inclusion or exclusion of variables. Practically, their selection is guided by research aims and relevant studies previously done on the subject. For instance, if we want to study the relationship between political stability and economic development in one nation, we need to select variables with which we can operationalize the two concepts, political stability and economic development. For political stability,

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<sup>92</sup>See *Information Please Almanac*: 1965, pp. 615-6.

<sup>93</sup>For a comprehensive list of national political units, see Russett-Singer-Small, 1969. The 500,000 population criterion for deleting smaller nations is arbitrary. For further discussion, see the comments of both Michael Haas and George Modelski, *et al.*, on the Russett-Singer-Small list, in the *American Political Science Review*, Vol. 62, No. 3, pp. 952-5.

TABLE 1  
LIST OF NATIONS (N = 82)

I.D. NO.	NAME OF NATION	CODE	I.D. NO.	NAME OF NATION	CODE
1.	Afghanistan	AFG	42.	Italy	ITA
2.	Albania	ALB	43.	Japan	JAP
3.	Argentina	ARG	44.	Jordan	JOR
4.	Australia	AUL	45.	Korea (DPRK)	KOM
5.	Austria	AUS	46.	Korea (ROK)	KOS
6.	Belgium	BEL	47.	Laos	LAO
7.	Bolivia	BOL	48.	Lebanon	LEB
8.	Brazil	BRA	49.	Liberia	LBR
9.	Bulgaria	BUL	50.	Libya	LBY
10.	Burma	BUR	51.	Mexico	MEX
11.	Cambodia	CAM	52.	Nepal	NEP
12.	Canada	CAN	53.	Netherlands	NTH
13.	Ceylon	CEY	54.	New Zealand	NEW
14.	Chile	CHL	55.	Nicaragua	NIC
15.	China (PRC)	CHN	56.	Norway	NOR
16.	China (ROC)	CHT	57.	Outer Mongolia	OUT
17.	Colombia	COL	58.	Pakistan	PAK
18.	Costa Rica	COS	59.	Panama	PAN
19.	Cuba	CUB	60.	Paraguay	PAR
20.	Czechoslovakia	CZE	61.	Peru	PER
21.	Denmark	DEN	62.	Philippines	PHI
22.	Dominican Republic	DOM	63.	Poland	POL
23.	Ecuador	ECU	64.	Portugal	POR
24.	Egypt (UAR)	EGP	65.	Rumania	RUM
25.	El Salvador	ELS	66.	Saudi Arabia	SAU
26.	Ethiopia	ETH	67.	Spain	SPN
27.	Finland	FIN	68.	Sweden	SWD
28.	France	FRN	69.	Switzerland	SWZ
29.	Germany (DDR)	GME	70.	Syria	SYR
30.	Germany (FRG)	GMW	71.	Thailand	TAI
31.	Greece	GRC	72.	Turkey	TUR
32.	Guatemala	GUA	73.	Union of South Africa	UNS
33.	Haiti	HAI	74.	USSR	USR
34.	Honduras	HON	75.	United Kingdom	UNK
35.	Hungary	HUN	76.	USA	USA
36.	India	IND	77.	Uruguay	URA
37.	Indonesia	INS	78.	Venezuela	VEN
38.	Iran	IRN	79.	Vietnam (North)	VTN
39.	Iraq	IRQ	80.	Vietnam (South)	VTS
40.	Ireland	IRE	81.	Yemen	YEM
41.	Israel	ISR	82.	Yugoslavia	YUG

we may select such variables as the number of persons killed in domestic violence, the number of anti-government demonstrations, and for economic development, gross national product per capita, the number of cars per one thousand persons, and the Engel's index.

The aim here was to assess the practical applicability of field theory in general and specifically, to find the structure of Communist China's foreign behavior patterns. The study is a general-type and not a specific research, in the sense that neither particular attributes nor behaviors were pre-selected in the proposed model. The study, therefore, required no particular set of variables to be included. The more general aspects of the attributes/behaviors of the nations the variables represented, the better.

For parsimony, however, the number of variables was reduced to a manageable size. Three subjective criteria were used in the actual selection: first, most, if not all, of the concepts which have been frequently adopted in current leading studies were included, so that the result of the study could be compared easily with other studies; second, data had to be available; and third, there had to be sufficient variance to be analyzed for China.<sup>94</sup>

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<sup>94</sup>A good guideline for selecting "basic indicators" of major attribute and behavioral concepts of nations is given in Rummel, 1969a. Since this is a study of one nation's (China) foreign behavior, some variables which appear frequently in global studies are not adoptable, due to insufficient variance. For example, the variable "military action" had only two non-zero entries out of eighty-two dyads in the 1955 and the 1963 behavior spaces, and had to be eliminated. If more than eighty percent of the cases had the same value for a variable, it was excluded.

### 5.2.1 Attribute Variables

For attribute variables, the basic concepts (dimensions) delineated by the series of the Dimensionality of Nations (DON) Project studies<sup>95</sup> were adopted as the basic categories to select variables. The seven dimensions which appeared in Rummel's work (Rummel, 1969a) were economic development, power (= size), politics (= political orientation), foreign conflict, domestic conflict, Catholic culture (= cultural characteristics of the society), and density. These seven include virtually all the prominent concepts which are used in most of the international relations studies: power theory (*e.g.* Morgenthau, 1966; Organski, 1968), status theory (Lagos, 1963),<sup>96</sup> and the rank theory (Galtung, 1964).

Furthermore, these seven basic concepts were cross-checked against similar studies (Russett, 1967; Berry, 1960; and Cattell and Gorsuch, 1965) and were found to fit quite well with them.<sup>97</sup> For this reason, it seems safe to use these basic concepts to represent the variation in attribute space.

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<sup>95</sup>See Rummel, 1964, 1966, 1968b, and 1969a.

<sup>96</sup>Lagos used three concepts: power, wealth, and prestige. Since "prestige" can be understood as a second-order concept based on power and wealth, it can be eliminated (see Rummel, 1970b).

<sup>97</sup>For example, the intraclass correlation with Russett (1967) was .93 and with Berry (1960), .96. The technique for comparison employed was Ahmavaara's transformation analysis. See Rummel, 1969a, p. 134, and Ahmavaara and Markkanen, 1958, pp. 80-3. Only Rummel's politics dimension had a relatively low correlation with Russett's (-.54). In order to cover this gap, I selected relatively many variables in the category of politics.

Based on the above concepts, five basic categories were selected: power base, economic development, military power, political orientation, and ethno-religious attributes. In addition, a special category, relations with China was included. To measure the variation in these six categories, the following thirty-five variables were selected, based on a broad scanning of traditional studies about China's behavior and my own research experience (those with an asterisk are the marker variables of the seven dimensions in Rummel's study<sup>98</sup>).

1. Power Base

\*population: "Modified present-in-area counts" (*Demographic Yearbook*, UN, 1956, p. 21).

national land area: "The total area of the specified geographical units, including inland water as well as such inhabited or uninhabitable stretches of land as may lie within their mainland boundaries" (*Demographic Yearbook*, UN, 1956, p. 24).

\*population density: Total population divided by national land area.

proportion of arable land: Arable land divided by total land area. Data were measured in percentages. Arable land refers to "land planted to crops ... land temporarily fallow, temporary meadows for mowing, and rubber plantation" (*Yearbook of Food and Agricultural Statistics: Production*, FAO, 1959, p. 388).

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<sup>98</sup>The marker variable of a dimension is the variable which loaded highest on that dimension. The reason for selecting marker variables is that the broadest possible variations in nations' attributes can be uncovered with the smallest number of variables. Selection of the highest loaded variables from each of the independent basic vectors virtually guarantees that the chosen variables would cover most of the variance in A-space which was originally contained in nearly one hundred different variables used in Rummel's original study (Rummel, 1966 and 1969b).

energy production: Includes the primary sources of energy: coal and lignite, crude petroleum, natural gas and hydro-electricity. All energy data were converted to metric ton equivalent of coal.

steel production: "The total production of crude steel, both ingots and steel for castings, whether obtained from pig-iron or scrap" (*Statistical Yearbook*, UN, 1960, p. 246).

gross national product: Total value of goods and services produced in a country in a year's time.

## 2. Economic Development

literacy rate: Literates/population ten years of age or older. Literacy is defined as the ability to read and write.

\*energy consumption per capita: Energy includes solid fuels, liquid fuels, natural and imported gas, and hydro- and imported electricity. All energy is measured in kilograms of coal which has equivalent heat.

telephone per capita: Telephone includes public and private telephones installed which "can be connected to a central exchange" (*Statistical Yearbook*, UN, 1960, p. 375).

population per physician: Physician refers to "all persons fully qualified or certified from a medical school" (*Statistical Yearbook*, UN, 1964, p. 651).

gross national product per capita: Gross national product divided by total population.

non-agricultural population/population: Non-agricultural population is the difference between the total population and the agricultural population. Agricultural population is defined as "all persons who depend on agriculture for a livelihood, that is to say, persons actively engaged in agriculture and their non-working dependents" (*Yearbook of Food and Agricultural Statistics: Production*, FAO, 1959, p. 389).

## 3. Military Power

size of armed forces: Number of military personnel. Civilians employed by the armed forces were excluded.

number of combat airplanes: Combat airplanes include fighter, fighter-bomber, bomber, attacker, interceptor, and armored reconnaissance planes.

defense expenditure: It includes total current and capital outlays.

#### 4. Political Attributes

\*bloc membership: Rating: 0 = Communist bloc membership, 1 = neutral bloc, 2 = Western bloc. Communist and Western bloc membership is determined by military treaties or alliances with the Soviet Union or the United States. The neutral bloc is a residual category.

Communist party membership/population: The number of party members is the estimate of the U.S. State Department.

\*killed in domestic violence: Any deaths resulting directly from violence of an intergroup nature within a nation, thus excluding deaths by murder and execution.

\*killed in foreign violence: The total number of deaths resulting directly from any violent interchange between countries.

U.S. economic aid received: Economic aid received from the Soviet Union.

colonialism: Rating: 0 = has been colonized in the past fifteen years, 1 = neither possessed colony nor was colonized, 2 = has possessed at least one colony in the past fifteen years.

freedom of group opposition: Rating: 0 = political opposition not permitted; groups not allowed to organize for political action; 1 = restricted political opposition allowed, groups free to organize politically, but oppositional role limited and they may not campaign for control of government; 2 = political opposition mostly unrestricted.

trade with Western bloc: Included both exports and imports. The Western bloc includes the following countries: AUL, BEL, CAN, CHT ('63 only), DEN, FRN, GMW, GRC, ITA, JAP ('63 only), KOS ('63 only), NTH, NEW, NOR, PAK, PHI, POR, TAI, TUR, USA, UNK.

trade with Communist bloc: The Communist bloc includes ALB, CHN, CZE, GME, HUN, KON, POL, RUM and USR.

trade direction index: The index was calculated with the following formula.

trade with Western bloc + (trade with Western bloc + trade  
with Communist bloc)

## 5. Ethno-religious Attributes

\*Roman Catholics/population: in percentages.

Protestants/population: in percentages.

Moslems/population: in percentages.

Buddhists/population: in percentages.

languages: Number of languages with membership exceeding one percent of the population. Language here refers to the "mother tongue."

## 6. Relation with China

Chinese population/population: Rating: 0 = none, 1 = 0-100, 2 = 101-1000, 3 = 1,001-10,000, 4 = 10,001-100,000, 5 = 100,000-1 million, 6 = more than 1 million or more than ten percent of the population, 7 = more than fifty percent of the population, 8 = more than ninety percent of the population.

geographical distance from China: Distances are between capitals and were measured in centimeters on a twelve inch globe.

attitude toward Chinese issue in UN voting: Rating: 0 = favorable to China, 1 = neutral (abstention and absence), 2 = unfavorable.

The variable names and the corresponding codes used in this study are given in Table 2, and the data with sources and footnotes are given in Appendix I-A.

### 5.2.2 Behavioral Variables

For behavior space, the basic unit for behavior is a dyad, a pair of nations with one as the actor and the other as the object. In other words, the directed behavior of one actor to a particular object nation is defined as "behavior." In this study, there is only one actor--China; and, all dyads are China→other nations. Since the number

TABLE 2  
LIST OF ATTRIBUTE VARIABLES

VARIABLE NUMBER	VARIABLE NAME	CODE
1	population	POPUL
2	national land area	AREAT
3	population density	DENST
4	proportion of arable land	ARLND
5	energy production	ENPRO
6	steel production	STPRO
7	gross national product	GNPTL
8	literacy rate	LITRC
9	energy consumption per capita	ENCON
10	telephone per capita	TELPH
11	population per physician	PHYSI
12	GNP per capita	GNPPC
13	non-agricultural population	NAGPO
14	geographical distance from China	GEODS
15	size of armed forces	FORCE
16	number of combat airplanes	COMPL
17	defense expenditure	DEFEX
18	bloc membership	BLOCM
19	communist party membership	COMST
20	killed in domestic violence	KILLD
21	killed in foreign violence	KILLF
22	U.S. aid received	USAID
23	U.S.S.R. aid received	URAIID
24	attitude toward China issue in UN voting	UNVOT
25	colonialism	COLON
26	Roman Catholic/population	CATHL
27	Protestants/population	PROTS
28	Moslems/population	MOSLM
29	Buddhists/population	BUDDH
30	languages	LANGH
31	Chinese/population	CHINS
32	freedom of group opposition	GOPPO
33	trade with Western bloc	WTRAD
34	trade with Communist bloc	CTRAD
35	trade direction index	ITRAD

Definitions of the variables are given in the main text.

of cases (nations) is eighty-two, the number of dyads is eighty-one. Data were collected for all eighty-one dyads.

To select the behavioral variables, I again examined the ten basic dimensions delineated by Rummel:<sup>99</sup> salience, emigration and communication, UN voting, foreign student, export, international organization, official conflict behavior, diplomatic representation, self-determination voting, anti-foreign behavior.

Unlike the A-space variables, the conceptual map was not directly applicable to this study. Although good for global studies, the concepts were inadequate for a one-actor dyadic study, mainly because we cannot expect sufficient variances for many of the variables with which the concepts were operationalized. For example, one of the most important behavior of Communist China to be explained is her military conflict with her neighbors. But for most of the variables which were frequently used to measure military conflict, *i.e.* war, discrete military action, maneuver, border clash, however, there was little variation--only two out of eighty-one dyads had non-zero entries (CHT and IND). Another important behavior was China's political interaction with others. This is usually measured with the political activities (voting) in the United Nations. For China, however, the UN roll call votes could not be used since she had never been a member of the organization.

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<sup>99</sup>The ten dimensions are a composite of four accumulated studies done by Rummel. See Rummel, 1969a, pp. 140-1.

Considering these circumstances, I chose the following seventeen variables in four categories.

1. Economic Behavior

export to the object: Total export, f.o.b. price in U.S. dollars, during the year.

import from the object: Total import, c.i.f. price in U.S. dollars, during the year.

economic aid to the object: Includes grants and long-term loans.

economic visit to the object: Includes government officials and civilians. Economic visit is defined as the visit, the main declared purpose of which is economic--trade conference, negotiation, market survey, etc.

economic visit from the object: Same as above.

2. Political Behavior

diplomat sent to the object: Includes only embassies. Rating: 0 = no diplomatic relations and no envoy; 5 = agreed to establish diplomatic relations, but no envoy has arrived yet; XX = 10 + the number of years since the envoy arrived.

diplomat from the object: Same as above.

treaties signed: Includes only bilateral treaties. Following the Chinese practice, a joint communique signed by the governments' official representatives is regarded as a treaty.

co-membership in international non-government organizations: Includes all NGO's.<sup>100</sup>

official political visit to the object: Includes only the visits by the following officials: the President of the People's Republic of China (PRC), Prime Minister, Deputy-prime Ministers, Minister of Foreign Affairs, Minister of Defense, Chairman of the Central Committee of the China Communist party (CCP), and the Chairman of the Standing Committee of the People's Congress of the PRC.

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<sup>100</sup>China was a member of only one IGO (Joint Nuclear Research Institute, 1956). The IGO membership was not used as a separate variable in this study.

official visit by the objects: Includes only the visits by the heads of government and cabinet members.

### 3. Verbal Communication

positive communication: Directed communication by the policy makers who are defined to include, the Chairman of the Central Committee of the CCP, the President of the PRC, the Chairman of the Standing Committee of the People's Congress of the PRC, the Prime Minister, the Minister of Foreign Affairs, the Minister of Defense, the Central Committee of the CCP, the presidium of the PRC, the Standing Committee of the People's Congress, and the Cabinet of the PRC. The data were collected from the articles of the *Jen-min Jih-pao* using the following formula

$$S = \sum_{i=1}^f (L_i \times D_i)$$

where S is the score of the total positive communication to the object,

L is the size of the article

1 = less than 30 lines or equivalent

2 = 30-100 lines or equivalent

3 = 100-200 lines or equivalent or the second top

4 = more than 200 lines or equivalent or the top

D is the cooperative scale

1 = friendly comment

2 = formal congratulations

3 = verbal support or appraisal of the object's policy

4 = suggestion of support

5 = concrete offer of support including detailed schedule

6 = decision of supportive action

f is the total number of articles which contain the verbal communication during the year.

negative communication: Directed communication by the policy makers (definition same as above), with the same formula with a difference in meaning only for the D scale, where

D is the degree of hostility scale

1 = critical comment

2 = accusation, agitation, or the equivalent

3 = demand of corrective actions

4 = warning (without specified sanctions)

5 = threat (with concrete sanction)

6 = decision of hostile action

#### 4. Saliency (Concern)

unofficial political visit to and from the object: The visits by the leaders of the parties of the object nations which were currently not in power (e.g. Italian Communist party, Japanese Communist party)/the visits by China's party leaders with the non-ruling political party leaders of the object nations. Measured in terms of frequency.

degree of official concern: Data were collected from the *Jen-min Jih-pao* using the following formula:

$$C = \frac{f}{\sum_{i=1}^f R_i}$$

where C is the degree of concern score

$R_i$  is an article reporting about the object nation, without regard to the subject matter, scaled according to the length of the article (scales are same as for positive communication)

f is the total number in a year.

cultural visit to the object: All non-political, non-economic visits by the Chinese citizen disregarding the rank of the person.

cultural visit from the object: Same as above.

The variable names and corresponding codes used in this study are presented in Table 3, and data with footnotes and sources are given in Appendix I-B. The data were difficult to collect, especially for B-space variables, since China has revealed few statistics. For variables 1-7, China's own publications (mainly the Yearbook) were used primarily, with a thorough check against the publications of the China watchers. For variables 9-17, however, data were generated directly from *Jen-min Jih-pao*.<sup>101</sup>

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<sup>101</sup>With a specially designed code sheet, the contents of all articles contained in the 1955 and 1963 issues of the *Jen-min Jih-pao* (730 daily issues) were converted into codes. A total of 20,770 code sheets were filled and all necessary data were generated from these master code sheets.

TABLE 3  
LIST OF BEHAVIORAL VARIABLES

VARIABLE NUMBER	VARIABLE NAME	CODE
1	export to the object	EXPOR
2	import from the object	IMPOR
3	economic aid to the object	ECAID
4	diplomat sent to the object	DIPFP
5	diplomat from the object	DIPTP
6	treaties signed	TREAT
7	co-membership of NGO	CONGO
8	official political visit to the object	POFVT
9	official political visit from the object	POFVF
10	unofficial visit from the object	PNOVF
11	economic visit to the object	ECOVV
12	economic visit from the object	ECOVF
13	cultural visit to the object	CULVT
14	cultural visit from the object	CULVF
15	official concern	CONCN
16	positive communication	POCOM
17	negative communication	NECOM

Definitions of the variables are given in the main text.

### 5.3 Missing Data Estimation

In general, there are four approaches to solving the problem of missing data in cross-national data: 1) the order of the data matrix can be reduced until only the complete data remain, 2) missing data may be treated as blanks in the analysis, 3) some of the missing data may be estimated judgementally, or 4) all the data may be estimated by ratings, mean values, measurement scale reduction, factor analysis, or regression analysis (see Wall and Rummel, 1969, p. 1).

In this study, methods 3) and 4) were applied jointly. First, so far as I deemed it adequate, I estimated the missing data subjectively based on my knowledge. Then, I estimated the remainder using the MISDAT program developed by Wall and Rummel.<sup>102</sup> With this method, the available data for each variable were regressed on the available data for the other variables to determine regression estimates for the missing data. Then, with the estimated data included, the computations were repeated again and again until the estimates converged to stable values for the missing data. This process was applied to all variables with missing data. In the data presented in Appendix I-A and I-B, those which were subjectively estimated were marked with the letter "R" (following the figures) and those which were machine-estimated were marked with "M."

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<sup>102</sup>See Wall and Rummel, 1969, pp. 1-2. This is a kind of regression estimate method. The recent version of the computer program for MISDAT, called the Dynamic Missing Data Estimation Program (the algorithm remains unchanged) is available at the DON Project.

#### 5.4 Data Transformation

Although the normalities of the distribution of each variable are not required in this kind of population study,<sup>103</sup> the heavily skewed nature of the variables affects the overall relations among variables. Even the addition of one extreme outlying observation may change completely the correlation between two variables in a small population. This has been one of the most serious problems in working with empirical data. The prevailing practice has been to transform the data in order to improve the normalcy of frequency distribution, for example, by taking the logarithm of the original values.

Practically, however, transformation brings another problem--its justification. Why must a proposed relationship among the variables appear with the data transformed in a particular way? The proposed relationship must hold regardless of the units of measurement employed if it is to be a general lawlike relationship.

Exclusion of the case with an extreme value also cannot be justified. In the actual world data, for example, the U.S.A. has extremely high values for various variables measuring power and economic development. These extreme values obviously affect the correlations among the variables, and we shall have patterns of a nation's behavior which, without the U.S.A., may be completely different. Thus, we cannot justify the exclusion of the extreme case, if

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<sup>103</sup>If our study is a sample study from which the relations among variables in the universe are supposed to be inferred, we need multivariate normal distribution (at least an approximation) of each variable against all other variables. Otherwise, we cannot measure the reliability of derived statistics by standard indices like standard error.

we want to look at a world phenomenon as it is. And again if the proposed relationship among the variables is a lawlike generalization, the basic form of that relationship must appear whether we exclude certain cases or not.

Based on this simple argument, I designed a unique method to assess the reliability of my analyses. First I did all the analyses with the data in its original form. Then, I transformed all skewed variables which exceeded the value of 2.5,<sup>104</sup> and analyzed them. Third, I reduced the number of cases to fifty-six from the original eighty-two by eliminating those nations whose entries are zeroes across more than ten variables out of seventeen behavior variables and did the same analysis.<sup>105</sup> And, finally, the reduced matrix was transformed and reanalyzed.

Then, the results of the four different analyses were cross-checked against each other to get the stable relationship among the variables, which were free from data manipulations. From now on, these four data sets will be referred to as O (original data set), T (transformed data set), R (reduced data set), and RT (reduced and transformed data set).

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<sup>104</sup>This was done for both the 1955 and the 1963 spaces. In A-space, nineteen variables and in B-space six variables were transformed. For all these twenty-five variables, the square roots of the original values were taken.

<sup>105</sup>The excluded nations are: BOL, CHL, COL, COS, DEN, DOM, ECU, ELS, ETH, GRC, GUA, HAI, HON, IRE, JOR, LBR, LBY, MEX, NIC, PAN, PAR, PER, POR, SPN, URA, and YEM.

## CHAPTER VI

## ATTRIBUTE DIMENSIONS

Theoretically, there may be an infinite number of concepts with which a nation's attribute can be described. Since there is no rule for which concept one must include in his study (theory), the decision of selecting concepts has to be made by the one who builds the theory.<sup>106</sup> In field theory, however, the concepts are not specified by the theory building. The theory simply defines a general relationship between a nation's attribute distances from the object nation and her behavior toward the object nation in terms of basis dimensional vectors of both A- and B-spaces without specifying with what concepts the basis should be delineated.

In this kind of general theory, the ideal set of attribute variables, therefore, is one which exhausts all the variability in nations' attributes. In practice, however, this is unavailable, and in this particular study, thirty-five variables were selected on the basis of substantial significance--mainly the popularity of the concepts in current leading studies.

Field theory, however, assumes that attribute space has a finite number of dimensions, from which all concepts are derivable as

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<sup>106</sup>However, there are some practical criteria: 1) the concepts must be meaningful for interested people; 2) the smaller the number of concepts in a theory, the better; 3) the meanings of the concepts must be as clear as possible. A comprehensive guideline for selecting indicators of the concepts is given in Rummel, 1969a.

a linear combination of the basis dimensional concepts. This means that once the basis dimensions are known, we can represent all the variability in attributes with a set of dimensional vectors no matter how many original variables there were. Practically, however, we cannot discover the exact basis dimensions, because empirically we are looking for a basis for a set of finite variables. The one we deal with, therefore, is an approximate basis of the space. In this study, unless specified otherwise, this approximated basis of the space will be referred to.

In order to delineate the basis dimensions of attribute space, the space consisting of the aforesaid thirty-five variables was factor analyzed. The principal component technique and the component factor model were used.<sup>107</sup> To get the simplest factor structure (the clearest clustering of variables), they were rotated orthogonally using the varimax criteria.<sup>108</sup>

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<sup>107</sup>Field theory deals with all variances, common as well as specific, of the variables; therefore, the component model was used.

<sup>108</sup>An oblique rotation was avoided, because the resulting bases were to be used in multiple regression analysis and canonical analysis. If the factors are mutually interrelated, we cannot distinguish the contribution of the individual factors from the interaction effects among them.

The dimensionality of the space was fourteen,<sup>109</sup> and each factor was labeled substantively by examining highly loaded variables on the dimensions. The fourteen rotated factors of the original data are presented on Table 4, and the labels of the factors with the variables they represent are given in Table 5.

To assess the reliability of the analysis, I repeated the factor analysis (the same factor technique and rotation procedure) three more times, each time with one of the three remaining parallel data sets I mentioned earlier (5.4): transformed data (T), data with reduced cases (R) and reduced and transformed data (RT). Then, the factor loadings of the variables on each basis dimension of the three data sets were cross-checked against the corresponding loadings of the original data set. Comparisons were made in terms of the product-moment correlations between the factors of the two matrices (original data and the other) after the factors of one matrix (the other) were rotated to a least squares fit to those of another matrix (original data set).<sup>110</sup>

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<sup>109</sup>In the component factor model, the dimensionality is usually equal to the number of the original variables. For practical purposes, we cut off relatively insignificant factors. To determine the number of factors, I considered the following facts: 1) both in the 1955 and the 1963 spaces, fourteen factors cover more than 90 percent of the total variance, 2) from the fifteenth eigenvector, the eigenvalues do not reduce much (scree test; the eigenvalue of the fourteenth eigenvector was .56 and .54 for the 1955 and 1963 spaces, respectively), which means that the variances loaded on the remaining eigenvectors may safely be assumed to be random errors, and 3) in the four different analyses (O, T, R, and RT), all the fourteen factors were identifiable across the different data sets.

<sup>110</sup>For the factor comparison, Ahmavaara's transformation method was employed.

TABLE 4  
 FACTOR LOADINGS OF 35 A-SPACE VARIABLES  
 ON FOURTEEN BASIS DIMENSIONS

(1) 1955 ORIGINAL DATA

VARIABLES	I POWER	II PORIE	III DEVEL	IV WESTC	V URAI	VI AGRIC	VII ORIEN
1 POPUL	-29	03	06	-05	<u>83</u>	05	15
2 AREAT	-46	06	-16	08	<u>39</u>	-39	07
3 DENST	05	-05	-14	04	04	<u>86</u>	16
4 ARLND	-07	27	-11	07	08	<u>79</u>	-25
5 ENPRO	-97	-02	-17	-01	06	<u>01</u>	01
6 STPRO	-96	-02	-20	02	03	04	01
7 GNPTI	-98	-02	-18	01	08	-00	03
8 LITRC	-11	10	-71	40	02	19	-04
9 ENCON	-51	04	-73	06	-02	21	-03
10 TELPH	-33	-07	-86	-07	-04	-05	02
11 PHYSI	01	09	15	-04	-05	02	06
12 GNPPC	-47	-08	-80	04	-04	00	-03
13 NAGPO	-13	-08	-79	27	-07	17	-08
14 GEODS	-02	-44	-03	49	-15	-37	-50
15 FORCE	-68	15	-06	04	<u>54</u>	-04	10
16 COMPL	-97	04	-15	01	<u>08</u>	-07	01
17 DEFEX	-98	-02	-15	-02	03	-01	04
18 BLOCM	-00	-85	-08	14	-20	-05	02
19 COMST	-02	<u>78</u>	-01	18	-03	23	-04
20 KILLD	03	14	-01	02	08	06	-01
21 KILLF	-10	19	04	01	-01	04	11
22 USAID	02	-20	25	-10	-06	30	13
23 URAID	00	17	07	03	<u>90</u>	07	05
24 UNVOT	-04	-82	05	19	-21	-03	-08
25 COLON	-16	-30	-54	19	12	10	-26
26 CATHL	04	-33	12	<u>74</u>	-04	02	-34
27 PROTS	-03	08	-84	-11	-01	-11	-07
28 MOSLM	02	-05	<u>36</u>	-83	-06	-10	-24
29 BUDDH	05	29	22	<u>01</u>	-06	-06	<u>75</u>
30 LANGN	-04	03	13	-13	10	-04	01
31 CHINS	-20	-11	02	01	25	-01	<u>86</u>
32 GOPPO	00	-42	-22	09	-09	02	02
33 WTRAD	-60	-26	-54	-04	-02	20	08
34 CTRAD	-29	-02	-46	-08	04	23	-10
35 ITRAD	01	-77	-09	01	12	15	-16
% OF TOTAL VARIANCE	18.9	10.3	14.6	5.5	6.3	6.0	5.8

(CONTINUED)

TABLE 4

(CONTINUED)

FACTOR LOADINGS OF 35 A-SPACE VARIABLES  
ON FOURTEEN BASIS DIMENSIONS

(1) 1955 ORIGINAL DATA

VARIABLES	VIII DIVER	IX WELFA	X POSTA	XI CTRAD	XII COLON	XIII FCONF	XIV USAID
1 POPUL	-23	-01	12	-09	04	01	09
2 AREAT	-41	-06	03	-23	-13	14	07
3 DENST	05	-05	-05	-21	03	08	07
4 ARLND	02	08	20	11	-07	-04	16
5 ENPRO	01	-00	-01	-02	-01	01	-04
6 STPRO	-01	01	-02	-10	00	04	-00
7 GNPTL	-02	00	01	-03	02	02	01
8 LI'TRC	19	-26	06	-05	03	-05	01
9 ENCON	02	-09	03	-10	-03	-07	-21
10 TELPH	09	-02	-02	09	13	-09	-05
11 PHYSI	-06	<u>92</u>	00	-01	-03	-06	-00
12 GNPPC	07	-08	-01	-02	11	-04	-13
13 NAGPO	11	-22	09	-17	04	00	-09
14 GEODS	10	-10	08	01	-03	-07	-14
15 FORCE	-20	-07	-02	-16	-13	17	13
16 COMPL	-06	-01	-02	00	-01	06	04
17 DEFEX	04	00	01	05	01	-02	-02
18 BLOCM	14	-01	-05	-08	14	-17	16
19 COMST	-01	-21	19	-03	-30	-01	-12
20 KILLD	03	-00	<u>96</u>	02	-06	15	-01
21 KILLF	-07	-06	<u>16</u>	-05	-03	<u>92</u>	-07
22 USAID	-19	-15	-01	-04	00	-10	<u>76</u>
23 URAID	10	-04	-01	10	-08	-05	-13
24 UNVOT	-02	-15	-09	-19	-08	-13	-01
25 COLON	29	15	-07	-18	-38	01	18
26 CATHL	15	-17	10	-01	-03	-08	-21
27 PROTS	-23	14	-06	-04	-02	14	07
28 MOSLM	-03	-10	06	-07	-08	-09	-08
29 BUDDH	21	22	-10	02	12	06	19
30 LANGN	<u>-90</u>	07	-03	07	01	05	11
31 CHINS	-15	-09	08	02	-05	08	-05
32 GOPPO	03	-03	-09	-09	<u>80</u>	-04	02
33 WTRAD	07	-00	02	-31	<u>08</u>	-09	-14
34 CTRAD	08	00	-03	<u>-69</u>	13	12	05
35 ITRAD	-11	-17	10	<u>40</u>	07	05	-07
% OF TOTAL VARIANCE	4.2	3.6	3.2	3.0	3.0	3.1	2.7

(CONTINUED)

TABLE 4  
(CONTINUED)

FACTOR LOADINGS OF 35 A-SPACE VARIABLES  
ON FOURTEEN BASIS DIMENSIONS

(2) 1963 ORIGINAL DATA

VARIABLES	I POWER	II PORIE	III DEVEL	IV WESTC	V URAIID	VI AGRIC	VII ORIEI
1 POPUL	<u>-41</u>	-13	06	05	02	02	-07
2 AREAT	<u>-64</u>	-06	-08	-02	01	-28	-03
3 DENST	<u>05</u>	03	-13	13	-07	<u>91</u>	-04
4 ARLND	-03	-38	03	-15	17	<u>66</u>	-08
5 ENPRO	<u>-97</u>	-03	-17	-01	-02	-07	02
6 STPRO	<u>-94</u>	-02	-21	03	-01	09	-03
7 GNPTL	<u>-95</u>	05	-24	02	-05	01	-01
8 LITRC	<u>-09</u>	-11	<u>-51</u>	-03	02	13	-22
9 ENCON	-42	-16	<u>-78</u>	-12	-08	15	-10
10 TELPH	-24	12	<u>-90</u>	01	01	-06	-02
11 PHYSI	04	-03	<u>14</u>	08	02	-02	09
12 GNPPC	-36	11	<u>-87</u>	-05	-05	03	-04
13 NAGPO	-12	11	<u>-76</u>	-21	02	21	-10
14 GEODS	02	38	<u>03</u>	<u>-66</u>	-06	-36	-33
15 FORCE	<u>-82</u>	-19	-06	<u>06</u>	13	05	-02
16 COMPL	<u>-87</u>	-15	-10	01	11	-04	-00
17 DEFEX	<u>-94</u>	01	-17	00	-03	-06	-00
18 BLOCM	<u>02</u>	<u>89</u>	-06	-08	07	08	-11
19 COMST	-07	<u>-83</u>	-02	-14	10	16	-13
20 KILLD	01	<u>07</u>	06	12	02	00	-02
21 KILLF	-04	-05	11	05	03	09	08
22 USAID	03	16	19	02	-08	09	08
23 URAID	05	<u>-57</u>	12	04	<u>-60</u>	-01	03
24 UNVOT	-06	<u>75</u>	11	-28	<u>-04</u>	-00	-19
25 COLON	-16	15	-40	-16	-04	19	-03
26 CATHL	05	30	16	<u>-60</u>	-10	03	<u>-53</u>
27 PROTS	-05	-10	<u>-78</u>	05	28	-14	-07
28 MOSLM	04	-01	<u>25</u>	-09	-03	-07	<u>92</u>
29 BUDDH	03	-05	26	<u>89</u>	-02	-02	-19
30 LANGN	-09	-05	12	<u>04</u>	-01	-04	07
31 CHINS	-26	07	04	<u>54</u>	-21	-01	-22
32 GOPPO	01	<u>63</u>	-41	-12	13	01	-04
33 WTRAD	<u>-61</u>	<u>27</u>	<u>-56</u>	01	-19	29	-01
34 CTRAD	<u>-43</u>	<u>-58</u>	-07	-09	11	11	-11
35 ITRAD	07	<u>91</u>	-08	-13	07	-02	01
% OF TOTAL VARIANCE	19.1	13.2	13.5	6.2	1.9	5.1	4.3

(CONTINUED)

TABLE 4  
(CONTINUED)

FACTOR LOADINGS OF 35 A-SPACE VARIABLES  
ON FOURTEEN BASIS DIMENSIONS

(2) 1963 ORIGINAL DATA

VARIABLES	VIII DIVER	IX WELFA	X POSTA	XI CTRAD	XII COLON	XIII FCONF	XIV USAID
1 POPUL	09	04	-10	12	04	<u>-59</u>	<u>57</u>
2 AREAT	19	-01	-02	<u>55</u>	02	-21	09
3 DENST	-06	-07	-01	07	02	-16	01
4 ARLND	05	-05	03	-28	31	15	20
5 ENPRO	02	-02	-01	-02	02	-06	-01
6 STPRO	03	-04	-02	18	01	03	-03
7 GNPTL	-04	-02	-01	-15	04	02	01
8 LITRC	-16	<u>-66</u>	15	12	12	07	-00
9 ENCON	-06	<u>-14</u>	01	-00	02	05	-12
10 TELPH	-08	-08	-02	-10	08	01	-04
11 PHYSI	-02	<u>90</u>	09	02	-03	00	-02
12 GNPPC	-07	-15	-04	-04	05	07	-07
13 NAGPO	-08	-37	-11	14	01	04	-09
14 GEODS	-13	-07	-07	00	02	20	-07
15 FORCE	09	-05	04	26	05	-34	12
16 COMPL	14	-04	01	38	04	-04	-00
17 DEFEX	-05	-01	01	-21	03	-02	-01
18 BLOCM	-10	-08	08	-01	07	07	02
19 COMST	-01	-18	07	02	-11	-02	-12
20 KILLD	-03	04	<u>94</u>	00	-11	01	12
21 KILLF	-03	03	-02	-00	-02	<u>-94</u>	-03
22 USAID	19	-02	20	-01	-08	01	<u>84</u>
23 URAID	04	-02	-05	-10	08	00	<u>47</u>
24 UNVOT	-00	-31	14	-02	-05	-02	-20
25 COLON	-05	-12	-20	00	<u>78</u>	-01	-09
26 CATHL	-26	-22	-07	04	-03	12	-11
27 PROTS	20	19	02	19	20	03	-03
28 MOSLM	02	16	-03	-03	-03	02	03
29 BUDDH	-11	06	05	-03	-15	02	-04
30 LANGR	<u>94</u>	05	-03	09	-03	-03	18
31 CHINS	16	-04	19	06	05	<u>-54</u>	02
32 GOPPO	-04	-31	-24	02	-14	15	26
33 WTRAD	-12	-02	-05	-09	00	04	-01
34 CTRAD	16	-11	02	<u>59</u>	-04	02	-03
35 ITRAD	07	13	06	-10	00	-02	04
% OF TOTAL VARIANCE	3.9	5.3	3.4	3.4	2.5	5.3	4.4

TABLE 5  
 LABELS OF FOURTEEN A-SPACE  
 BASIS DIMENSIONS

FACTOR	FACTOR LABELS	FACTOR CODE	HIGH-LOADING VARIABLES
I	Power	POWER	ENPRO, STPRO, GNPTL, FORCE, COMPL, DEFEX
II	Political Orientation	PORIE	BLOCM, COMST, UNVOT ITRAD
III	Economic Development	DEVEL	LITRC, ENCON, TELPH, GNPPC, NAGPO
IV	Western Culture	WESTC	GEODS, CATHL
V	U.S.S.R. Aid	URAI	URAI
VI	Agricultural Culture	AGRIC	DENST, ARLND
VII	Oriental Culture	ORIEN	MOSLM, BUDDH, CHINS
VIII	Ethno-religious Diversity	DIVER	LANGN
IX	Welfare	WELFA	PHYSI
X	Political Stability	POSTA	KILLD
XI	Communist Trade	CTRAD	CTRAD
XII	Colonialism	COLON	COLON
XIII	Foreign Conflict	FCONF	KILLF
XIV	U. S. Aid	USAID	USAID

Two kinds of correlation were calculated: the correlation between each pair of individual corresponding dimensions, and the correlation between the two super columns each of which was formed by connecting all columns in the matrix into one. The results of the comparison are presented in Table 6-1. As we can see in the table, all four data sets have very similar factor patterns: all the overall correlations of T, R and RT with O in both years exceed .98. This means that the factors can be derived using skewed data with some extreme outliers. This is an important finding, because it supports the generality of field theory, i.e., the basis dimensions of the space is not affected by the unit of measure of the data. This finding suggests that we can rely on the original data for further analyses. From now on I will use the original data set as a primary data set for all analyses. For a loading by loading comparison the loadings of all four data sets are placed in one combined table in Appendix II-A.

It is also clear that the dimensions are sufficiently similar between the 1955 and the 1963 spaces. The factors of the two spaces were compared with the same technique used above. The results are summarized in Table 6-2. Considering measurement error, a correlation of .95 is sufficient to say that the factor patterns are the same across the two spaces. This stable factor pattern over time is significant, since this also supports axiom 3 of field theory.

The factor scores of these fourteen factors were calculated and the scores were used as the indicators of the A-space basis dimensions for testing the field theory models. The factor scores of the fourteen

TABLE 6-1  
A-SPACE FACTOR PATTERN STABILITY AMONG DIFFERENT DATA SETS

FACTORS		1955			1963		
		T <sup>a</sup>	R	RT	T	R	RT
1	POWER	.99 <sup>b</sup>	.98	.97	.99	1.00	.99
2	PORIE	.99	1.00	.99	.98	.97	.99
3	DEVEL	.98	.93	.91	.61	.98	.98
4	WESTC	.99	.99	.98	.99	.72	.72
5	URAIID	.99	.92	.60	.68	.98	.71
6	AGRIC	.97	1.00	.71	.97	.98	.98
7	ORIEN	.99	.84	.96	.74	.83	.79
8	DIVER	.98	.98	.89	.95	.93	.96
9	WELFA	.94	.96	.91	.95	.99	.96
10	POSTA	.93	.99	.93	.86	.91	.70
11	CTRAD	.93	.97	.89	.99	.82	.84
12	COLON	.97	.86	.71	.97	.99	.96
13	FCONF	.88	.91	.96	.97	.98	.98
14	USAID	.75	.92	.69	.78	.97	.89
OVERALL <sup>c</sup> CORRELATION		.99	.99	.98	.98	.99	.98

<sup>a</sup> T = Transformed data (N = 82)  
R = Reduced data (N = 56)  
RT = Reduced and Transformed data (N = 56)

<sup>b</sup> Correlation between the loadings of the factor of the indicated data with the loadings of the corresponding factor of the original data.

<sup>c</sup> Correlation between all loadings of the indicated data and those of the original data. Correlation was calculated between the two super columns, each of which was formed by connecting all columns in the matrix into one long column.

TABLE 6-2  
 A-SPACE FACTOR PATTERN STABILITY OVER TIME:  
 FACTOR COMPARISON BETWEEN 1955 AND 1963 SPACES

FACTORS	KINDS OF DATA			
	O <sup>a</sup>	T	R	RT
1 POWER	1.00 <sup>b</sup>	.99	1.00	1.00
2 PORIE	.96	.96	.98	.98
3 DEVEL	.95	.77	.96	.97
4 WESTC	.89	.92	.94	.97
5 URAID	.33	.51	.62	.68
6 AGRIC	.95	.99	.95	.99
7 ORIEN	.82	.91	.92	.92
8 DIVER	.88	.85	.92	.91
9 WELFA	.94	.48	.96	.82
10 POSTA	.93	.93	.92	.91
11 CTRAD	.72	.27	.65	.52
12 COLON	.58	.61	.86	.88
13 FCONF	.91	.95	.94	.94
14 USAID	.81	.66	.87	.04
OVERALL <sup>c</sup> CORRELATION	.95	.96	.95	.96

<sup>a</sup>O = Original Data (N = 82)  
 T = Transformed Data (N = 82)  
 R = Reduced Data Matrix (N = 56)  
 RT = Reduced and Transformed (N = 56)

<sup>b</sup>Correlation between corresponding factors in 1955 and 1963 spaces. Signs are ignored.

<sup>c</sup>Correlation between actual 1963 factor loadings ( $F_{63}$ ) and the 1963 factor loadings estimated from 1955 factor loadings from the following equation,

$$\hat{F}_{63} = F_{55}L$$

where L is the transformation matrix for least-square fit. Correlation was calculated between two super columns, each of which was formed by connecting all columns one after another, in the  $F_{63}$  and the  $\hat{F}_{63}$  matrices, respectively.

rotated factors are given in Appendix III-A.

The fourteen factors also show the stability of the factor patterns across different studies. A-space has been previously analyzed by others.<sup>111</sup> The fourteen factors of this study are almost the same as those of Rummel's finding. A comparison of the fourteen factors of this study and the fifteen factors of Rummel's study (Rummel, 1964b) is given in Table 7. This similarity across different studies<sup>112</sup> seems to indicate that there is a fundamental basis of nations' attributes and we shall be able to find a stable common indicator which could represent nations' attributes generally.

The fourteen factors also identified all popular concepts frequently adopted in international relations studies. As shown in Table 5, the most general concepts like power, economic development, political orientation emerged distinctly as the basis dimensions of the attribute space.

The first factor was labeled "power" dimension (POWER), on which defense expenditure (.98),<sup>113</sup> total GNP (.98), combat airplanes (.98),

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<sup>111</sup>See Sawyer, 1967; Rummel, 1967, 1968; Van Atta and Rummel, 1970. Rummel did a component analysis of 236 attributes for 82 nations (the same nations as in this study) on 1955 data and extracted fifteen basis dimensions (Rummel, 1964b). In Table 7, "Rummel's study" refers to Rummel, 1964b, "Orthogonally Rotated Factor Tables for 236 Variables."

<sup>112</sup>The similarity is partly due to the fact that seven marker variables of Rummel's study were included in this study. Even with this "hooking," the results are significant, since there were more different variables than similar variables in the two studies.

<sup>113</sup>In parentheses are the loadings for the original data analysis, 1955 (0-55). For loadings for other analyses, see Appendix II-A. For simplicity, signs are dropped.

TABLE 7  
A-SPACE FACTORS:  
COMPARISON WITH RUMMEL'S STUDY<sup>a</sup>

FACTORS OF THIS STUDY	HIGH-LOADING VARIABLES			RUMMEL'S FACTORS
	LOADING	VARIABLE NAME	LOADING	
POWER (Power)	.95	Defense expenditure	.83	Power
	.93	Gross national product	.85	
	.93	Combat airplanes	--	
	.97	Energy production	.84	
	.96	Steel production	.66	
	.68	Size of armed forces	.73	
	.29	Population	.91	
POLIT (Political Orientation)	.85	Bloc membership	.86	Political Orientation
	.82	UN voting on China issue	--	
	.78	Communist Party Membership	.49	
	.77	Index of trade direction	--	
	--	English titles translated/ all translated	1.10	
DEVEL (Economic Development)	.86	Telephone/pop	.95	Economic Development
	.84	Protestants/pop	.65	
	.80	GNI/pop	.91	
	.79	Non-agricultural pop/ pop	.92	
	.73	Energy consumption/pop	.90	
	.71	Literacy	--	
	--	Pupils in primary school	.84	
WESTC (Western Culture)	.83	Moslem(negative)/pop	.44	Catholic Culture
	.74	Catholic pop/pop	.73	
	.49	Geographical distance from China	--	
	--	Air distance from U.S. (negative)	.71	
FCONF (Foreign Conflict)	.92	Killed in foreign conflict	.76	Foreign Conflict
	--	Threats	.85	
	--	Accusations	.83	
AGRIC (Agricultural Culture)	.86	Population/land area	.90	Size
	.79	Arable land/land area	.73	
ORIEN (Oriental Culture)	.75	Buddhist pop/pop	.56	Asian
	.86	Chinese pop/pop	--	
	--	Mongolian pop/pop	.60	
	--	Religious groups > 1% pop	.65	
POSTA (Political Stability)	.96	Killed in domestic violence	.69	Domestic Conflict
	--	General strikes	.69	
DIVER (Diversity)	.90	Language groups > 1% pop	.69	Ethnic-Linguistic Diversity

<sup>a</sup> Refers to Rummel, 1964b; "Orthogonally Rotated Factor Tables for 236 Variables."

energy production (.97), steel production (.96) and size of armed forces (.68) loaded highly. All these variables are well known indicators of power,<sup>114</sup> and we can give the label without hesitance.

The second factor on which bloc membership (.85), UN voting (.82), communist membership (.78) and trade direction index (.77) loaded highly is called the "political orientation" dimension (PORIE), since all of these variables are related, directly or indirectly, to the nation's political orientation. The third factor was labeled "economic development" (DEVEL), since telephone (.86), Protestants (.84), GNP per capita (.80), non-agricultural population (.79), energy consumption (.73) and literacy (.71) loaded highly on it. Except for Protestants, all variables are indicators of economic development. The variable Protestants loaded highly on this dimension, because most economically developed nations had a high proportion of Protestants among the population.

Catholic population (.74), geographical distance (.66), and either Moslem population (.83; 1955) or Buddhist population (.85; 1963) loaded highly on the fourth factor. This means that the nations with a high percentage of Roman Catholics and with a low percentage of Moslems or Buddhists and geographically distant from China have high scores on this dimension. For this reason, I labeled the factor "Western culture" (WESTC). Only Soviet aid (.90) loaded highly on the

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<sup>114</sup>Out of six highly loaded variables, DEFEX, COMPL and FORCE are indicators of current military power, while the other three--GNPTL, ENPRO and STPRO--are the indicators of the power capability of the nation, which shows the potential for future military power.

fifth factor which was, therefore, named "U.S.S.R. aid" (URAIID).

The sixth factor was the one which Rummel labeled as the "density" factor in his recent study.<sup>115</sup> Two variables, density (.86) and arable land (.79), loaded highly on this factor which I labeled "agricultural culture"(AGRIC) in a sense that the factor indicates common characteristics of agricultural culture. The seventh factor was named "oriental culture" (ORIEI), because Chinese population (.86) and either Buddhist population (.75; 1955) or Moslem population (.92) loaded highly on it.

Only single variables loaded highly on the eighth to fourteenth factors and they were labeled, according to the concepts which the variables were supposed to represent. They were "diversity" (DIVER+LANGN),<sup>116</sup> "welfare" (WELFA+PHYSI), "political stability (POSTA+KILLD), "communist trade partner" (CTRAD+CTRAD), "colonialism" (COLON+COLON), "foreign conflict" (FCONF+KILLF) and "U.S. aid" (USAID+USAID).

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<sup>115</sup>See Van Atta and Rummel, 1970, p. 11.

<sup>116</sup>The first codes are for factor names, and the latter, the codes of highest loaded variables.

## CHAPTER VII

## CHINA'S FOREIGN BEHAVIOR DIMENSIONS

For behavior space, the same factor analysis as in A-space analysis was carried out in order to delineate the basis dimensions of China's foreign behavior. The same criteria as for the A-space analysis were applied to determine the number of factors; as a result, seven factors were extracted. The factors are presented in Table 8.

A substantive label was given to each dimension in terms of the behavior most correlated with it. The first factor, on which export (.97) and import (.98) loaded highly, was labeled "trade" (TRADE). The second factor was named "formal diplomacy" (FDIPL), since diplomat from Peking (.90) and diplomat to Peking (.90) loaded highly on it. The third factor on which non-official political visit (.86), economic visit to the object (.83) and economic visit from the object (.66) loaded highly in both the 1955 and the 1963 spaces was labeled "informal diplomacy" (INDIP). The other remaining four dimensions were labeled with the names of the highest loading variables: economic aid (ECAID; .96), negative communication (NECOM; .99), co-membership in international non-governmental organization (CONGO; .89) and official political visit (POFVT; .84). The labels and the variables loading highly ( $\geq .50$ ) are given in Table 9 to show the structure of each factor at a glance.

TABLE 8  
 FACTOR LOADINGS OF 17 B-SPACE VARIABLES  
 ON SEVEN BASIS DIMENSIONS

(1) 1955 ORIGINAL DATA

FACTORS	I TRADE	II FDIPL	III INDIP	IV ECAID	V NECOM	VI CONGO	VII VISIT
1 EXPOR	<u>97</u>	07	-13	02	03	-08	-03
2 IMPOR	<u>98</u>	09	-07	03	03	-07	-04
3 ECAID	<u>13</u>	17	-02	<u>96</u>	02	01	05
4 DIPFP	22	<u>90</u>	-11	<u>14</u>	04	-13	23
5 DIPTP	23	<u>90</u>	-11	13	04	-18	21
6 TREAT	52	<u>39</u>	-29	17	07	-32	39
7 CONGO	15	22	-20	-01	-04	<u>-89</u>	11
8 POFVT	08	38	-02	04	03	<u>-13</u>	<u>84</u>
9 POFVF	-03	08	<u>-75</u>	18	-05	11	<u>42</u>
10 PNOVF	23	-02	<u>-86</u>	08	01	-25	03
11 ECOVT	41	29	<u>-66</u>	-23	01	-04	-25
12 ECOVF	30	17	<u>-83</u>	-07	01	-17	-02
13 CULVT	<u>67</u>	46	-27	-10	05	-04	06
14 CULVF	<u>54</u>	37	-30	-08	-04	-37	42
15 CONCN	<u>83</u>	18	-39	11	-20	-11	18
16 POCOM	<u>92</u>	20	-18	18	-01	-07	13
17 NECOM	02	-06	-01	-02	<u>-99</u>	-03	-02
% OF TOTAL VARIANCE	28.8	15.1	17.1	6.7	6.2	7.3	8.5

(CONTINUED)

TABLE 8  
(CONTINUED)  
FACTOR LOADINGS OF 17 B-SPACE VARIABLES  
ON SEVEN BASIS DIMENSIONS

(2) 1963 ORIGINAL DATA

FACTORS	I TRADE	II FDIPL	III INDIP	IV ECAID	V NECOM	VI CONGO	VII VISIT
1 EXPOR	<u>-86</u>	-23	25	10	07	02	-02
2 IMPOR	<u>-83</u>	07	13	14	18	-28	01
3 ECAID	-06	-11	26	<u>88</u>	-06	-00	04
4 DIPFP	-07	<u>-96</u>	11	<u>19</u>	04	-05	09
5 DIPTP	-07	<u>-96</u>	12	18	05	-07	06
6 TREAT	-21	-28	<u>79</u>	16	-06	02	26
7 CONGO	-20	-12	<u>16</u>	-14	14	<u>-08</u>	-16
8 POFVT	-22	-36	20	<u>64</u>	-03	<u>18</u>	20
9 POFVF	02	-17	26	<u>22</u>	-01	18	<u>86</u>
10 PNOVF	-13	06	<u>88</u>	13	-01	-15	<u>24</u>
11 ECOVT	-29	-23	<u>74</u>	15	-01	13	-30
12 ECOVF	00	-06	<u>94</u>	16	-01	-10	-04
13 CULVT	-17	-22	<u>66</u>	<u>56</u>	-03	-08	21
14 CULVF	-13	-04	<u>88</u>	<u>35</u>	00	-03	16
15 CONCN	-06	-07	<u>66</u>	46	47	-05	03
16 POCOM	-10	-22	<u>50</u>	<u>65</u>	16	20	13
17 NECOM	-19	-06	<u>-06</u>	<u>-04</u>	<u>95</u>	-12	-03
% OF TOTAL VARIANCE	10.4	13.6	29.6	14.8	7.2	6.1	7.1

TABLE 7  
 LABELS OF SEVEN H-SPACE BASIC DIMENSIONS

FACTOR	FACTOR LABELS	FACTOR CODE	BI-MULTI-VARIABLES
I	Trade	TRADE	EXPOR, IMPOR ('55: TREAS, CULTV, CONCH, POCOM)
II	Formal Diplomacy	FDIPM	DIPFI, DIPTP
III	Informal Diplomacy	INDIP	INDIP, INDIPV, INDIPF ('55: TREAS, CULTV, CONCH, POCOM)
IV	Economic Aid	ECAID	ECAID ('53: POFVT, CULTV, POCOM)
V	Negative Communication	NECOM	NECOM
VI	NGO Co-Membership	CONGO	CONGO
VII	Political Visit	VISIT	POFVT

Again factor analysis was repeated three more times with three modified data sets--transformed data (T), reduced data (R), and reduced and transformed (RT)--to see the stability of the pattern structure of B-space. The results of the comparison are summarized in Table 10-1, and the loadings of the four data sets (the above three and the original data set) are presented side by side in Appendix II-B for easy cross-checking.

As we can see in Table 10-1, factor patterns were quite similar across the four data sets, except for the last two factors whose eigenvalues were so low (.50) that the variances were safely attributable to random error.

Unlike A-space, however, the factor patterns over time were not so stable. Although we could identify the same factors in both time spaces, the component variables of the first two factors were changed. In 1955, export, import, treaty, cultural visit to the object, cultural visit from the object, official concern, and positive communication loaded on the first factor, trade; and non-official political visit, economic visit to the object, and economic visit from the object loaded on the second factor, informal diplomacy (INDIP). In 1963, however, the last five variables of the first factor shifted to the second factor. This means that in 1955, for example, treaty signing, cultural interaction and political appraisal were deeply interrelated with trade, while in 1963, these activities were associated with informal diplomacy.

TABLE 10-1  
B-SPACE FACTOR PATTERN STABILITY  
AMONG DIFFERENT DATA SETS

FACTORS		1955			1963		
		T <sup>a</sup>	R	RT	T	R	RT
1	TRADE	.98 <sup>b</sup>	1.00	.98	.96	1.00	.97
2	FDIPL	.97	.99	.97	1.00	1.00	1.00
3	INDIP	.99	.98	.97	.99	1.00	.99
4	ECAID	1.00	1.00	.99	.97	.97	.97
5	NECOM	1.00	1.00	.99	.99	.99	.99
6	CONGO	.98	.98	.98	.95	.95	.94
7	VISIT	1.00	.93	.92	.97	.97	.99
OVERALL <sup>c</sup> CORRELATION		.99	1.00	.99	.98	1.00	.99

<sup>a</sup>T = Transformed data (N = 81)

R = Reduced data (N = 55)

RT = Reduced and Transformed data (N = 55)

<sup>b</sup>Correlation between the loadings of the factor of the indicated data with the loadings of the corresponding factor of the original data.

<sup>c</sup>Correlation between all loadings of the indicated data and those of the original data. The correlation was calculated between the two super columns, each of which was formed by connecting all columns in the matrix into one long column.

One possible interpretation may be that China, at the beginning of her nationhood, was not fully prepared to launch a systemic diplomatic campaign. As a result, she did not "use" verbal communication (POCOM), for instance, as a tool of diplomacy. China simply traded with old friends (Communist countries) and praised old friends. Checking the factor scores, we can see that the nations high on this dimension are USR (8.47),<sup>117</sup> VTN (1.37), GME (1.05), POL (.47), KON (.42), CZE (.36), and YUG (.27), and this partly supports this interpretation. By 1963, however, China's foreign policy was well structured and the policy-makers could play diplomatic games utilizing all available resources. As a result, for example, China strategically praised a certain nation to lure her into China's orbit, or in other words, she could verbally praise or direct cultural visits to a nation to insure the success of her political penetration plan (INDIP represented by PNOVT).

In 1955, for instance, positive communication was highly correlated with import (.94)<sup>118</sup> and export (.94). This means that verbal praise was directed to old Communist friends with whom China traded most. In 1963, however, positive communication was poorly correlated with import (.21) and export (.36) on the one hand, while on the other hand it showed fairly high correlations with economic aid (.67), economic visit from the object (.58), cultural visit to the object (.77),

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<sup>117</sup>The figures are standardized factor scores.

<sup>118</sup>The figures are product-moment correlations.

cultural visit from the object (.69) and official concern (.75), which tells us that positive communication was linked to other penetration tools like cultural visits, economic aid and economic visits, etc.

In 1955, non-official political visit was not so much correlated with cultural visit to the object (.42) or cultural visit from the object (.46), while in 1963 it was strongly correlated with them (CULVT: .72, CULVF: .93), which again supports the hypothesis of systemized policy strategy of China in 1963.

As a whole, the informal diplomacy dimension of 1963 was different from that of 1955 in the sense that informal diplomacy represented by non-official political visit was reinforced by cultural visit to the object, cultural visit from the object, positive communication, etc. The factor scores on this dimension shows us to which nations China's informal diplomacy was oriented.<sup>119</sup> The nations high on the informal diplomacy (INDIP) dimension in 1963 were, in descending order, JAP (7.09),<sup>120</sup> KON (3.40), PAK (2.02), INS (1.37), VTN (1.13), BRA (1.07), RUM (.77), UNK (.61), ALB (.54), and CUB (.51).

Although several variables shifted from TRADE to INDIP in the 1963 space as we have just discussed, the overall factor structure of both spaces were quite similar. As we can see in Table 10-2, the overall correlations between the 1955 and the 1963 factor loadings

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<sup>119</sup>Later (in Chapter 9), this will be discussed in detail.

<sup>120</sup>The figures are standardized factor scores.

TABLE 10-2

B-SPACE FACTOR PATTERN STABILITY OVER TIME:  
 FACTOR COMPARISON BETWEEN 1955 AND 1963 SPACES

FACTORS	KINDS OF DATA <sup>a</sup>			
	O	T	R	RT
1 TRADE	.72 <sup>b</sup>	.68	.70	.67
2 FDIPL	.98	.97	.97	.95
3 INDIP	.91	.86	.98	.97
4 ECAID	.97	.69	.96	.67
5 NECOM	.98	.96	.98	.97
6 CONGO	.85	.79	.80	.70
7 VISIT	.77	.58	.83	.76
OVERALL <sup>c</sup> CORRELATION	.91	.92	.90	.91

<sup>a</sup>O = Original Data (N = 81)  
 T = Transformed Data (N = 81)  
 R = Reduced Data Matrix (N = 55)  
 RT = Reduced and Transformed (N = 55)

<sup>b</sup>Correlation between corresponding factors in 1955 and 1963 spaces. Signs are ignored.

<sup>c</sup>Correlation between actual 1963 factor loadings ( $F_{63}$ ) and the 1963 factor loadings estimated from 1955 factor loadings from the following equation,

$$\hat{F}_{63} = F_{55}L$$

where L is transformation matrix for least-square fit. Correlation was calculated between two super columns, each of which was formed by connecting all columns one after another, in the  $F_{63}$  and the  $\hat{F}_{63}$  matrices, respectively.

were greater than .90 in all four sets of data.<sup>121</sup>

It is difficult to compare the factors of B-space with those of similar studies. In this study, all dyads have the same actor--China, and this means that we are dealing with only one nation's behavior pattern, while other studies include many actors and deal with the general pattern of nations' behavior. As mentioned earlier (5.2), a one-actor-behavior-space creates many problems such as restrictions on the selection of variables.<sup>122</sup> If the list of variables are completely different for the two studies, it is very difficult to compare the factor patterns.

The dimensions of B-space in this study, however, may be meaningfully compared to the ones delineated in a one-actor dyadic study done on U.S. foreign behavior by Rummel (Rummel, 1970b). Though the actors are different, there are many aspects to be compared: both studies shared many variables, the year of the analyses was the same (1955), and the population of the studies was the same (the same eighty-two nations).

The factors were matched one by one through the common high loading variables as shown in Table 11-1. As we can see in the table, we can identify four similar factors in the two studies: Trade↔Anglo-American cooperation, formal diplomacy↔cold war, negative communication

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<sup>121</sup>The correlations were calculated using Ahmavaara's transformation analysis technique. See Ahmavaara and Markkanen, 1958. See also footnote in the table.

<sup>122</sup>The sphere of interaction of a single nation is usually very restricted. Many variables such as military conflict, anti-government demonstrations, tourist, expulsion of diplomats were excluded because of low variance.

TABLE 11-1  
R-SPACE FACTORS:  
COMPARISON WITH RUMMEL'S STUDY ON USA<sup>a</sup>

FACTORS OF THIS STUDY	HIGH-LOADING VARIABLES			RUMMEL'S FACTORS
	LOADING	VARIABLE NAME	LOADING	
TRADE (Trade)	.97	Exports	.93	Anglo-American Cooperation
	.98	Imports	--	
	--	Exports of book	.99	
FDIPL (Formal Diplomacy)	.90	Diplomat sent to Peking	--	Cold War
	--	Embassy or Legation	.69	
CONGO (Co-Membership of NGO)	.89	NGO Co-membership	--	None
NECOM (Negative Communication)	.99	Negative Communication	.90	Deterrence
	--	Military Violence	.94	
INDIP (Informal Diplomacy)	.86	Non-Official Visit	--	None
ECAID (Economic Aid)	.96	Economic Aid	.91	Aid
VISIT (Official Political Visit)	.84	Official Political Visit	--	None
None	--	Students	.84	Western European Cooperation
	--	Conference	.75	
None	--	Negative Sanction	.81	Negative Sanction

<sup>a</sup>Rummel, R. J. "U. S. Foreign Relations: Conflict, Cooperation and Attribute Distances," The Dimensionality of Nations Project, Research Report No. 41. Honolulu: University of Hawaii, 1970.

←deterrence, economic aid→aid. The most salient (in terms of variance accounted for) factor in Rummel's study--Western European Cooperation--, however, could not be matched with any in this study. This was because all the high loading variables on this factor were the ones omitted in this study.

From this comparison, we can find that a nation's cooperation behavior is independent of both formal diplomacy and conflict behavior, the implication of which will be discussed in detail later.

The factors of this study were also compared to those delineated from global studies.

As references, two of Rummel's works were chosen. The first one was "Field Theory and Indicators of International Behavior," in which Rummel tested field theory (both Model I and II) using 1955 data and a selected sample of 182 nation dyads. Since one of his aims with the work was to select indicators of such central concepts as cooperation, conflict, and transaction, he included all possible variables to cover every possible aspect of international relations between nations. Therefore, the dimensions delineated in that study may be assumed to be sufficiently general as a reference.<sup>123</sup>

Again, in terms of highly loaded variables, each of the seven factors in my study correspond to a factor in Rummel's study, as shown

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<sup>123</sup>Ten dimensions of nations' behavior were found in the study = salience, emigration and communication, UN voting, foreign students, export, international organizations, official conflict behavior, diplomatic representation, self-determination voting and anti-foreign demonstration. See Rummel, 1969b.

in Table 11-3. The figures are the factor loadings of the variables on the dimension.

As we can see in the table, it was possible to match five out of the total seven factors of this study to corresponding ones in Rummel's study. The other two concepts, aid (E'AID) and official political visits (VITIT) could not be matched, simply because Rummel did not include the variables related to these concepts.

The second global study compared to was "Field Theory and the 1963 Behavior Space of Nations" (Rummel, 1970c). This study was done with fifty-six variables for 189 dyads generated from fourteen selected sample nations using 1963 data.

Out of the sixteen orthogonal factors found in Rummel's study, six could be identified with six of the seven factors found in this study, by checking common high loading variables. The results of the comparison are given in Table 11-3.

The high comparability of the factors in this study with those of global studies is significant, because it indicates that the foreign behavior of nations, though seemingly complicated, can be defined in terms of several common ingredients. The generality of the common basis of nations' behavior confirms axiom 3 of field theory and assures us of the applicability of field theory to one-actor dyadic study.

In subsequent analyses, the factor scores of the seven factors will be used as the measuring units of China's behavior toward other nations on that dimension. The scores are given in Appendix III-B.

TABLE 11-2

B-SPACE FACTORS: COMPARISON WITH RUMMEL'S GLOBAL STUDY, 1955<sup>a</sup>

FACTORS OF THIS STUDY	HIGH-LOADING VARIABLES			RUMMEL'S FACTORS
	LOADING	VARIABLE NAME	LOADING	
TRADE (Trade)	.97	Exports	.95	Export
	.98	Imports	--	
FDIPL (Formal Diplomacy)	.90	Diplomat sent to Peking	--	Diplomatic
	.90	Diplomat received by Peking	--	
	--	(Relative embassy legation)	--	
CONGO (Co-Membership of NGO)	.89	NGO	.51	International Organization
	--	Relative IGO	.86	
	--	Relative NGO	.79	
NECOM (Negative Communication)	.99	Negative Communication	.81	Deterrence
	--	Military Violence	.81	
INDIP (Informal Diplomacy)	.86	Non-Official Political Visit	--	Communication
	--	Relative Mail	.90	
	.65	Positive Communication	--	
ECAID (Economic Aid)	.96	Economic Aid	--	None
VISIT (Official Political Visit)	.84	Official Political Visit	--	None

<sup>a</sup>R. J. Rummel. "Field Theory and Indicators of International Behavior." The Dimensionality of Nations Project, Research Report No. 29. Honolulu: University of Hawaii, 1969. The factor analysis was done for 182 dyads generated from fourteen selected nations.

TABLE 11-3  
B-SPACE FACTORS: COMPARISON WITH RUMMEL'S GLOBAL STUDY, 1963<sup>a</sup>

FACTORS OF THIS STUDY	HIGH-LOADING VARIABLES			RUMMEL'S FACTORS
	LOADING	VARIABLE NAME	LOADING	
TRADE (Trade)	.86	Exports	.83	Salience
	--	Books	.87	
	--	Tourists	.87	
FDIPL (Formal Diplomacy)	.96	Diplomat sent to Peking	--	Diplomatic
	--	Relative Embassy	.90	
CONGO (Co-Membership of NGO)	.88	NGO Co-Membership	.88	International Organization
	--	Relative IGO	.86	
NECOM (Negative Communication)	.95	Negative Communication	.86	Deterrence I
	--	Total Conflict	.87	
INDIP (Informal Diplomacy)	.79	Treaty	--	None
ECAID (Economic Aid)	.88	Aid	.93	Aid
	--	Relative Treaty	.95	
VISIT (Official Political Visit)	.86	Visits	.73	Students
	--	Students	.86	

<sup>a</sup>Rummel, R. J. "Field Theory and the 1963 Behavior Space of Nations." The Dimensionality of Nations Project, Research Report No. 44. Honolulu: University of Hawaii, 1970.

## CHAPTER VIII

### ASSESSMENT OF FIELD THEORY FOR CHINA'S BEHAVIOR

One of the basic propositions of field theory was that the sum of the attribute distance vectors works as a force to determine the dyadic behavior of the actor (see 3.2). In more rigorous terms, this says that there is a linear relationship between the basic dimensions of B-space and the attribute distances in A-space. And there were two different mathematical models--the Multiple Regression Model (MRM) and the Canonical Regression Model (CRM)--which represents the relationship between A- and B-spaces.

As discussed earlier in 4.1, the two models were tested with empirical data to determine fitness of the linear models to the data.

#### 8.1 Test Result of the Multiple Regression Model

The equation of the "Multiple Regression Model" (MRM) was,

$$W_{mxq} = D_{mxp} P_{pxq} + U_{mxq} \quad (10)$$

where  $W_{mxq}$  is the matrix of behavior space whose column vectors are the basis dimensions of B-space,  $D_{mxp}$  is the factor distance matrix

of the A-space,<sup>124</sup>  $P_{pxq}$  is the matrix of the regression coefficient and  $U_{mxq}$  is the residual matrix.

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<sup>124</sup>There have been several different interpretations of field theory concerning the "kind" of distances to be employed. For example, some have used Euclidean distances, where distance between nation i to j on l-th attribute is calculated as

$$d_{i \rightarrow j, l} = \pm \sqrt{(b_l - a_l)^2}$$

where  $d_{i \rightarrow j, l}$  is the distance on l-th variable,  $a_l$  and  $b_l$  are scores of i and j on variable l. Note that here we lost the "direction" of difference, since there are two square roots for one value (+ and -) and we do not know which to take. If there are more than two variables (e.g. l, k) then the distance between i and j will be

$$d_{i \rightarrow j} = \pm \sqrt{(b_l - a_l)^2 + (b_k - a_k)^2 \dots}$$

but in the original model of field theory, Rummel specified how to aggregate individual distances into one, stating that the aggregation should produce "the resolution" vector. Therefore, we cannot calculate the distances in this way.

Gleditsch (1969, pp. 12-3) once discussed four "permissible" interpretations of the distances. The four are 1) signed differences on attribute dimensions, 2) squared differences on attribute dimensions, 3) sums on attribute dimensions, and 4) squared sums on attribute dimensions. Among these, however, No. 3 and No. 4 are obviously not "distances" and should be excluded. The "squared differences" (No. 2) is also not desirable for the following two reasons: First, "squared distances" do not fit the original meaning of "distance," since it cannot discriminate the position of i from the position of j in the field. The "distance" is a quantity that defines the position of point i relative to other points in the field. It is the relative position which is defined by both direction and magnitude, not only the magnitude of the distances, that works as force. Second, there is no reason for substituting "squared differences" for "signed differences." The original argument for this substitution was basically grounded on the fact that with signed differences the behavior  $i \rightarrow j$  should be the exact reverse of  $j \rightarrow i$  which is unrealistic in the empirical world. But if we take Model II rather than Model I, this argument becomes pointless, since different weighting parameters for each nation actor will "adjust" this absurdity. As a conclusion, there is no alternative interpretation of the distances "permissible" within the context of field theory. I will retain the original interpretation of d as a distance vector and of D as comprising distance vectors.

First, each of the seven columns of W matrix was regressed on the fourteen columns of D to get the P matrix. Then, I calculated the predicted value of each case (dyad) on the same seven factors using the following equation

$$\hat{W} = DP \quad (24)$$

where  $\hat{W}$  is the calculated value for W. Residuals, U were obtained by subtracting  $\hat{W}$  from W ( $U = W - \hat{W}$ ). In order to see the overall linear fit between the two spaces, I calculated the product-moment correlation between W and  $\hat{W}$ . In order to see the sensitivity of the findings to the kind of data, the same analysis was done for all four parallel sets of data (O, T, R, and RT). Since the  $\hat{W}$  and U matrices are too big to be printed, only the product-moment correlations between W and  $\hat{W}$  appear in Table 12.

As we see in the table all the correlations were converged around .70, which means that about 50 percent of the variance is contained in the linear fit. Whether to accept this figure as satisfactory is a difficult decision because there is no objective standard. Considering possible error in the data collection and the arbitrariness in selecting variables, however, the fifty percent figure is relatively high and can serve as strong supporting evidence for the proposed linear relationship between attribute distances and behavior of nations.

TABLE 12

TEST RESULT OF MULTIPLE REGRESSION MODEL:  
CORRELATION BETWEEN PREDICTED AND OBSERVED BEHAVIOR

TYPE <sup>a</sup> OF DATA	1955		1963	
	r <sup>b</sup>	r <sup>2</sup>	r	r <sup>2</sup>
O	.713	.508	.704	.496
T	.689	.463	.631	.398
R	.728	.527	.725	.526
RT	.705	.497	.665	.442

<sup>a</sup>O = Original data (81 dyads)  
<sup>a</sup>T = Transformed data (squareroot transformation) (81 dyads)  
<sup>a</sup>R = Reduced data (55 dyads)  
<sup>a</sup>RT = Reduced and Transformed data (55 dyads)

<sup>b</sup>Correlations were calculated between the predicted scores,  $\hat{W}$  (= DP), and the observed scores, W. A super column was formed from each matrix into one long column, and, then, a product-moment correlation between the two super columns was calculated.

## 8.2 Test Results of the Canonical Regression Model

As discussed in 4.1.1, and 3.4.3, my major concern is the CRM.

The mathematical model of the CRM was,

$$W_{mxq} Q_{qxq} = D_{mxp} P_{pxq} + U_{mxq} \quad (18)$$

where  $W_{mxq}$  is the matrix of seven column vectors of the basis dimensions of B-space,  $Q_{qxq}$  is the matrix of canonical regression weights of the columns of the  $W_{mxq}$  matrix (China's behavioral framework),  $D_{mxp}$  is the matrix of the factor score distance vectors of the fourteen basis dimensions of A-space,  $P_{pxq}$  is the matrix of canonical regression coefficients which weight each of the columns of A-space matrix (China's perceptual framework), and  $U_{mxq}$  is the residual matrix ( $WQ - DP$ ).

Again, canonical regression analyses were done on all the four data sets; the results are presented in Table 13. In order to measure the overall fit between A- and B-space, the trace correlations (the average of seven canonical correlations) were calculated. Table 14 shows the trace correlations for the four data sets for both 1955 and 1963.

As shown by the  $r^2$  in Table 14, the result indicates that approximately 55 percent of the total variance in the spaces was accounted for by the model. Although the figures are not quite satisfactory, they still support linear relationship between A- and B-spaces

TABLE 13

TEST RESULTS OF CANONICAL REGRESSION MODEL<sup>a</sup> (1)

(1) 1955 DATA

KIND OF DATA <sup>b</sup>	O <sup>c</sup> R D E R	PROPORTION OF TOTAL VARIANCE <sup>d</sup>	r <sup>e</sup>	$\lambda$ <sup>f</sup>	$\chi^2$ <sup>g</sup>	d.f. <sup>h</sup>	Z <sup>i</sup> d.f. > 30	$\sigma$ <sup>j</sup>
O	1	9.5	.991	.000	659.4	98	22.3	0.13
	2	9.5	.954	.005	374.7	78	14.9	0.30
	3	10.1	.869	.053	205.9	60	9.4	0.51
	4	10.1	.729	.216	107.4	44	5.3	0.73
	5	9.0	.580	.460	54.4	30	2.7	0.91
	6	9.1	.441	.693	25.7	18	1.3	1.05
	7	9.5	.374	.860	10.5	8	0.7	1.11
T	1	9.5	.960	.001	493.8	98	17.5	0.28
	2	9.8	.923	.010	316.2	78	12.7	0.39
	3	10.2	.855	.074	182.7	60	8.2	0.53
	4	9.4	.715	.274	90.7	44	4.1	0.75
	5	9.6	.548	.560	40.6	30	1.3	0.94
	6	8.8	.373	.800	15.6	18	-0.3	1.11
	7	9.3	.266	.929	5.1	8	-0.7	1.20
R	1	9.5	.988	.000	435.7	98	15.6	0.15
	2	9.5	.968	.002	270.2	78	10.8	0.25
	3	10.2	.899	.034	148.6	60	6.3	0.45
	4	10.1	.792	.178	75.9	44	3.0	0.64
	5	8.5	.541	.478	32.5	30	0.4	0.95
	6	9.4	.455	.675	17.3	18	-0.0	1.03
	7	9.5	.385	.852	7.1	8	-0.1	1.10
RT	1	9.2	.966	.000	346.7	98	12.4	0.26
	2	10.0	.945	.006	227.5	78	8.9	0.33
	3	10.3	.893	.053	129.3	60	5.2	0.46
	4	9.4	.741	.261	59.1	44	1.5	0.71
	5	9.5	.489	.579	24.1	30	-0.7	1.00
	6	8.8	.390	.760	12.0	18	-1.0	1.09
	7	9.5	.322	.897	4.8	8	-0.8	1.15

(CONTINUED)

TABLE 13  
(Continued)

TEST RESULTS OF CANONICAL REGRESSION MODEL<sup>a</sup> (2)

(2) 1963 DATA

KIND OF DATA <sup>b</sup>	O <sup>c</sup> R D E R	PROPORTION OF TOTAL VARIANCE <sup>d</sup>	r <sup>e</sup>	$\lambda$ <sup>f</sup>	$\chi^2$ <sup>g</sup>	d.f. <sup>h</sup>	Z <sup>i</sup> d.f. $\geq 30$	$\sigma$ <sup>j</sup>
O	1	9.4	.968	.000	535.8	98	18.8	0.25
	2	9.6	.921	.007	343.0	78	13.7	0.40
	3	9.5	.858	.049	211.4	60	9.7	0.53
	4	9.3	.845	.186	117.9	44	6.0	0.55
	5	9.9	.445	.648	30.3	30	0.1	1.05
	6	9.6	.396	.808	14.9	18	-0.5	1.09
	7	9.7	.203	.959	3.0	8	-1.4	1.25
T	1	9.5	.961	.003	419.2	98	15.0	0.28
	2	9.6	.882	.032	240.1	78	9.5	0.48
	3	9.3	.798	.146	134.6	60	5.5	0.63
	4	8.9	.592	.403	63.7	44	2.0	0.90
	5	9.6	.470	.620	33.4	30	0.5	1.02
	6	9.6	.376	.796	15.9	18	-0.3	1.11
	7	9.6	.269	.928	5.3	8	-0.6	1.20
R	1	9.4	.965	.000	362.2	98	13.0	0.26
	2	9.6	.936	.004	244.5	78	9.7	0.35
	3	9.2	.904	.031	152.5	60	6.6	0.43
	4	9.6	.825	.171	77.7	44	3.1	0.59
	5	9.5	.514	.536	27.5	30	-0.3	0.98
	6	9.4	.469	.729	13.9	18	-0.6	1.02
	7	9.1	.257	.934	3.0	8	-1.4	1.21
RT	1	9.6	.961	.001	301.1	98	10.6	0.28
	2	9.5	.929	.014	187.5	78	6.9	0.37
	3	9.6	.837	.103	99.9	60	3.2	0.57
	4	8.6	.609	.345	46.8	44	0.3	0.88
	5	9.6	.472	.549	26.4	30	-0.4	1.02
	6	9.4	.436	.707	15.3	18	-0.4	1.05
	7	9.8	.357	.873	6.0	8	-0.4	1.12

(CONTINUED)

TABLE 13  
(Continued)

TEST RESULTS OF CANONICAL REGRESSION MODEL (3)

(3) FOOTNOTES

<sup>a</sup>For detailed explanation of each statistic given, see Rummel, 1970b, pp. 89-90, Appendix IV, and Van Atta and Rummel, 1970, p. 23.

<sup>b</sup>The symbols represent the following:

- O = Original data (N = 81)
- T = Transformed data (N = 81)
- R = Reduced data (N = 55)
- RT = Reduced and transformed data (N = 55)

<sup>c</sup>Order of canonical variate pairs, *e.g.* 1: first canonical variates, 2: second canonical variates, and so on.

<sup>d</sup>The proportion of total variance in the variables accounted for by each of the pairs of the canonical variates.

<sup>e</sup> $r$  = canonical correlations, the correlation between A- and B-spaces.

<sup>f</sup>The formula for  $\lambda$  is

$$\lambda = \prod_{k=1}^q (1-r_k^2)$$

where  $q$  is the number of canonical correlations,  $r_k$  is the  $k$ -th correlation.

<sup>g</sup>Chi-square equals  $-(n-0.5(p+q+1))\log_e \lambda$

where  $n$  = the number of cases (dyads),  $q$  = the number of behavioral dimensions (= 7), and  $p$  = the number of attribute dimensions (distances; = 14).

<sup>h</sup>d.f. = degrees of freedom

$$\text{d.f.} = \{p-(k-1)\}\{q-(k-1)\}$$

<sup>i</sup>Corresponding areas under the normal curve.

<sup>j</sup>Standard deviation (error) of residuals in equation 18. The residual,  $U = WQ - DP$ .

TABLE 14  
TRACE CORRELATIONS OF CANONICAL ANALYSES  
1955 AND 1963

KINDS OF <sup>a</sup> DATA	1955		1963	
	r	r <sup>2</sup>	r	r <sup>2</sup>
O	.74	.55	.72	.52
T	.71	.50	.67	.45
R	.76	.58	.74	.55
RT	.72	.52	.70	.49

<sup>a</sup>O = Original Data (N = 81)  
T = Transformed Data (N = 81)  
R = Reduced Data Matrix (N = 55)  
RT = Reduced and Transformed (N = 55)

in field theory.<sup>125</sup> Some possible reasons for the 45 percent un-  
predicted variance are: 1) too many "zero" cells in the behavior data  
matrix, 2) the limited number of variables, and 3) incorrect informa-  
tion. Comparing the trace correlations of the original data (O) to  
those of the reduced data set (R), we can see a slight increase (3%)  
in the latter. This seems to indicate that 1) holds. There is no  
evidence at this moment, however, for 2) and 3). Only after the  
analysis is redone with more variables and better data, can the results  
be compared.

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<sup>125</sup>The findings here are almost comparable to the findings of  
Rummel's two previous studies: For the China study (Rummel, 1969b),  
the trace was .77, the first canonical correlation was .97 and the  
second canonical correlation was .85; for the U.S. study (Rummel,  
1970b), the trace  $r = .68$ , 1st  $r = .94$ , 2nd  $r = .82$ . But the findings  
of this study are much better than the ones in the 1963 China study  
(Van Atta and Rummel, 1970): the trace  $r$  of Van Atta and Rummel's  
was .61, the first canonical  $r$  was .91 and the second canonical  $r$  was  
.45.

CHAPTER IX

PATTERNS OF CHINA'S FOREIGN BEHAVIOR

In Chapter VIII, the empirical test of field theory was discussed. The results confirmed the linear relations between behavior space and attribute distance space proposed by field theory and showed sufficient evidence for the applicability of the model for some restricted purposes<sup>126</sup> such as the delineation of the inner structure of the behavior-attribute distance linkage patterns. In this chapter, I will discuss the patterns of China's foreign behavior delineated by the canonical analysis (CRM).

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<sup>126</sup>The results were not completely satisfactory in the sense that the model, in its current form and tested with obtainable data, is not accurate enough to be used by policy makers to forecast real behavior. There is no general standard for determining the practical applicability of a behavior model. Different purposes may require different degrees of accuracy of prediction of the model. As we have seen in the previous chapter, the model, in general, accounts for more than fifty percent of the variance in behavior space. For example, in determining what attribute distances are important in explaining China's negative communication toward the object nations, the model which accounts for more than half of the total variance of negative communication behavior is acceptable.

But if the practitioner wants to use the model to estimate the amount of China's trade with a certain object nation, greater accuracy is required. Thus, I concluded that the model is inadequate for practical prediction. For practical forecasting, the standard deviation of error (real value minus estimated value) must be less than twenty percent of that of original variables. The detailed results of forecasting with the model will be discussed in Chapter X.

The canonical regression delineated seven patterns of China's foreign behavior. As discussed in 4.4, canonical analysis provides structure equations that relate a set of behavior variables (here, the basis dimensions of B-space) to a set of attribute distances (the basis dimensions A-space) in the form of linear combinations where the weighting coefficients are the partial correlations of the variables with the canonical variate scores.<sup>127</sup>

Since the coefficients (loadings), when squared, tell us the contributions of individual dimensional variables in constituting canonical variates, we can see the pattern structure of China's foreign behavior, *i.e.*, which distances are related to which behavior.

The form of the structure equation looks like the following:

$$b_{1h}W^1 + b_{2h}W^2 + \dots + b_{kh}W^k + \dots + b_{qh}W^q \\ + a_{1g}D^1 + a_{2g}D^2 + \dots + a_{lg}D^l + a_{pg}D^p \quad (20)$$

where  $b_{kh}$  is the loading of the  $k$ -th factor of  $W$  ( $W^k$ ) on the  $h$ -th canonical variate of B-space and  $a_{lg}$  is the loading of the  $l$ -th factor of  $D$  ( $D^l$ ) on the  $g$ -th canonical variate of A-space. The arrow means "relatedness" between the two combinations.<sup>128</sup>

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<sup>127</sup>Since the factors are almost orthogonal to each other in both A- and B-spaces and the scores are standardized, canonical regression coefficients are almost the same as the loadings.

<sup>128</sup>For a more detailed explanation of the canonical structure equation, see 4.4.

Out of the seven behavioral patterns of China found in the canonical regression analysis, the first five had canonical correlations which were statistically significant at the .01 level.<sup>129</sup> The sixth pattern had a correlation significant at the .10 and the seventh, at the .25 level. But the corresponding 1963 analysis gave only four patterns whose canonical correlations were significant at the .05 level.

In this chapter, the first four behavioral patterns which had significant correlations at the .05 level in both years will be interpreted in the first three sections. The four to be discussed are power-interaction (the first equation), the cold war (the second equation), the formal diplomacy (the third equation) and the behavior pattern related to international organizations (the fourth equation).

Of the three remaining patterns, the first two--informal diplomacy (the fifth equation) and economic penetration behavior (the sixth equation)--will also be discussed in the latter two sections. Not only were they significant in the 1955 analysis (though non-significant in 1963), they also repeatedly appeared in the studies with all other modified data sets. Therefore, they are also to be meaningfully discussed, in the sense that the patterns, at least, will give us some general feeling about China's behavioral patterns.

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<sup>129</sup>The Z value of the fifth canonical correlation with 30 degrees of freedom was 2.7, and corresponding  $P(Z > 2.457) = 0.01$ . For other Z values, see Table 13.

### 9.1 Power Interaction Pattern of China

The first behavioral pattern of China found in the canonical regression analysis mainly comprised two behavioral basis factors: negative communication and trade activities. The form of the relations between the two behavioral factors in the pattern was "additive": the two factors had the same positive signs.

The pattern in the form of the structure equation<sup>130</sup> delineated with the 1955 original data was

$$88 \text{ NECOM} + 46 \text{ TRADE} + 97 \text{ POWER} \quad (r = .99)^{131} \quad (25)$$

This equation shows us that approximately seventy-seven percent of the variance in negative communication behavior (NECOM) and eleven percent in trade activities (TRADE) are explained mainly by one attribute distance--power disparity. The equation tells us that the amount of "joint" behavior of China's negative communication and trade directed to an object nation is a function of the power distance of the

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<sup>130</sup>The signs of the coefficients are "adjusted" to make the interpretation easier. The signs of factor scores have only a "relative" meaning within the factor, *i.e.*, the figure with the negative sign (-) is on one side of the zero point on the continuum. The signs, therefore, are not "absolute." The scores of the same factor may reverse signs from one analysis to another, for example, if the number of the factors to be rotated changes, or if a different algorithm (MESA or MODULAR) is applied. Depending upon the signs of the original factor scores, the signs in the canonical structure equation change. In this study, the signs are "adjusted" to be meaningful.

<sup>131</sup>The figure in the parentheses is the canonical correlation for the equation when all variables (including the one omitted due to low loadings) are included in the equation.

nation from China. Verbally, this means that the more powerful<sup>132</sup> the object nation, the more hostile China's communication, with more trade<sup>133</sup> between the two nations.

It is worthwhile to note that by the "joint" behavior of NFCOM and TRADE, I do not imply that the two behavior scores vary together (covary). The two factors are mutually independent, and the correlation between them is almost zero. The positive parameters of the behavior vectors in the above equation tell us that the pattern comprises the two behaviors together in a positive way. The relation of the behavioral pattern and its component vectors can be geometrically illustrated as in Figure 4.

As we discussed in Chapter III, the canonical regression model of field theory delineates sets of mutually independent behavioral patterns, each of which is expressed in the form of a linear combination of the B-space basis dimensions. The above pattern, expressed as a linear combination of NECOM and TRADE is one of those found in the canonical regression analysis.

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<sup>132</sup>The independent variables are in terms of "difference" in factor scores. By difference we mean the score of the object minus China's score (signs retained) and not the "absolute" distance (see footnote 124). In 1955, China's score on POWER dimension was close to the mean value (in 1963, it was one standard deviation above the mean). Therefore, the POWER scores in this equation may be loosely interpreted as if they were "absolute" scores on the power scale. China's rank, however, is far above the center, since the mean value, itself, shifted to "powerful" direction because of several extreme cases such as USA (7.4 standard deviation high) and USSR (4.2 standard deviation high).

<sup>133</sup>As indicated by the low coefficient of TRADE (.46) in the equation, its contribution to the canonical variate score is small (21%). As will be discussed later (see 9.2) trade behavior is mainly explained by political orientation, rather than power disparity.

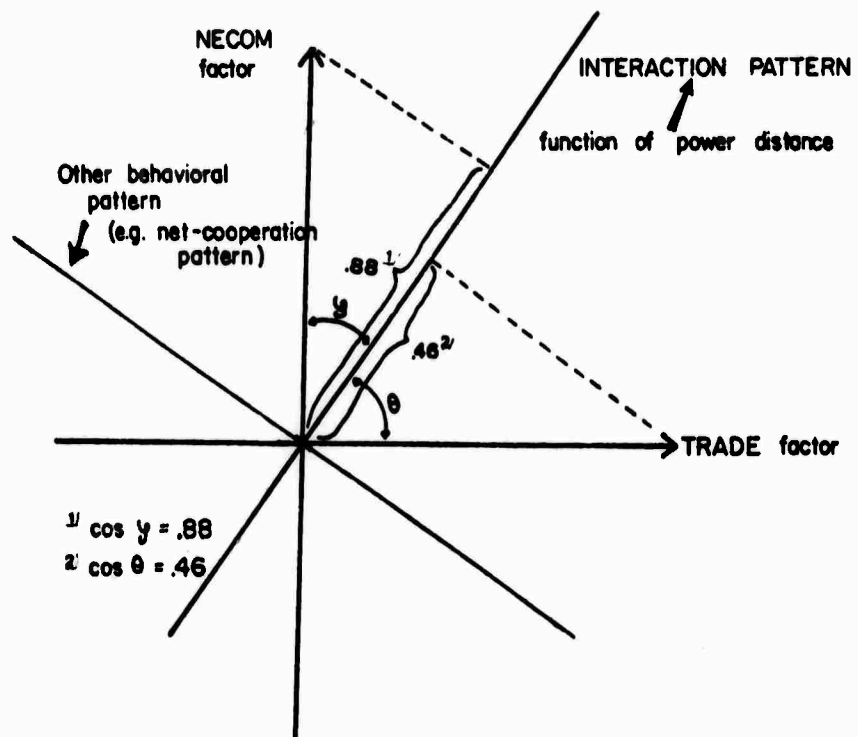


FIGURE 4

RELATIONSHIP BETWEEN BEHAVIOR PATTERN  
AND ITS COMPONENT BEHAVIOR VECTORS

The pattern is composed of both conflict behavior (NECOM) and cooperation (TRADE) together and is mostly explained by the power disparity between China and the object nation. This pattern, therefore, depicts only the intensity of interaction disregarding whether the behavior is conflictful or cooperative. Since the explaining variable is power distance, and the pattern was neutral to the quality of the behavior, the pattern is named "power interaction pattern." The canonical correlation for this structure equation is .99. This means that nearly all of the joint behavior of China's negative communication and trade (NECOM + TRADE) can be explained by power disparity (to the amount of 99 percent of the variance). Applying this equation, we can calculate a set of estimates of behavior scores for the combination of NECOM and TRADE, the interaction pattern scores (intensity of interaction) for each object nation from power disparity. Figure 5 plots the estimates of this behavior combination from power disparity. In the plot, as expected from the high canonical correlation (.99), the dyads are aligned fairly close to the 45 degree line (perfect prediction line). From the plot we can see that such a high correlation as .99 was due mainly to two extreme dyads, CHN→USA and CHN→USR. Even after eliminating the two dyads, however, the plots still show a satisfactory alignment.

In order to see the direct relationship between POWER and NECOM (without TRADE contamination) the factor scores of NECOM was directly plotted against POWER in Figure 6. Comparing Figure 5 to Figure 6, we can see clearly that the high value of USA on the Y axis in Figure 5 was mainly due to the high NECOM score, while that of USR was the

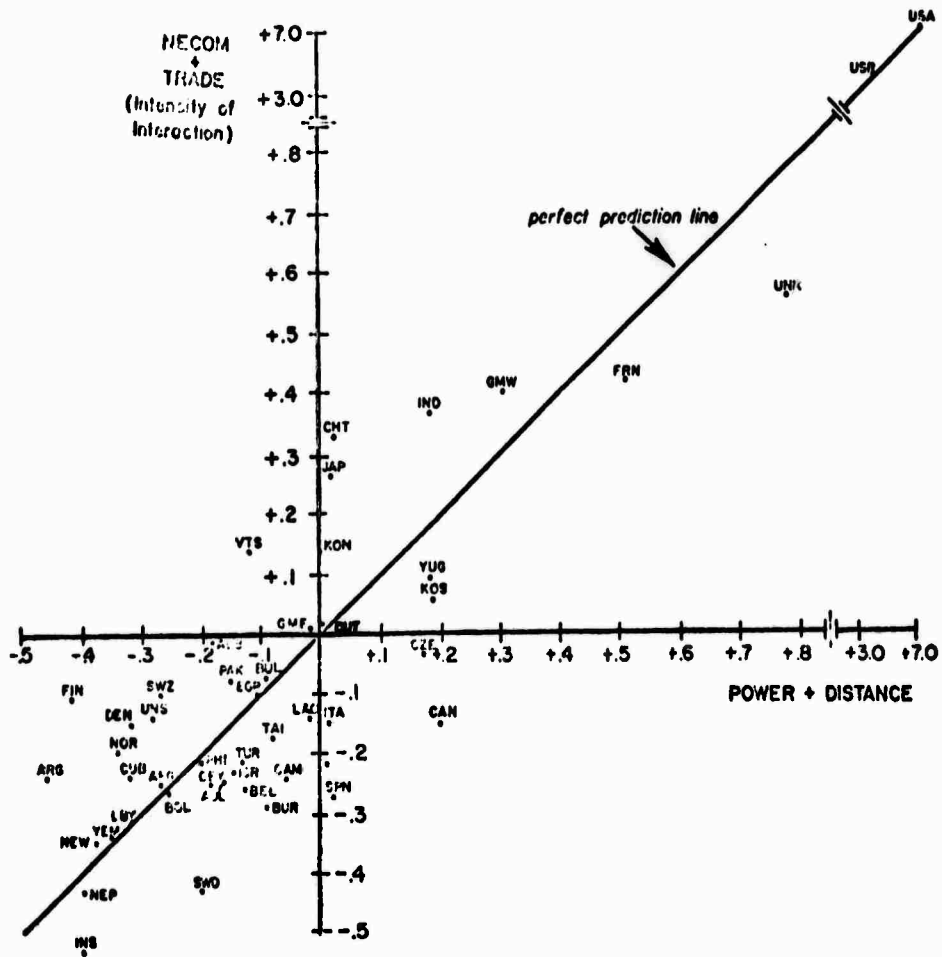


FIGURE 5  
CHINA'S JOINT BEHAVIOR OF NECOM + TRADE, 1955  
(canonical variate scores)

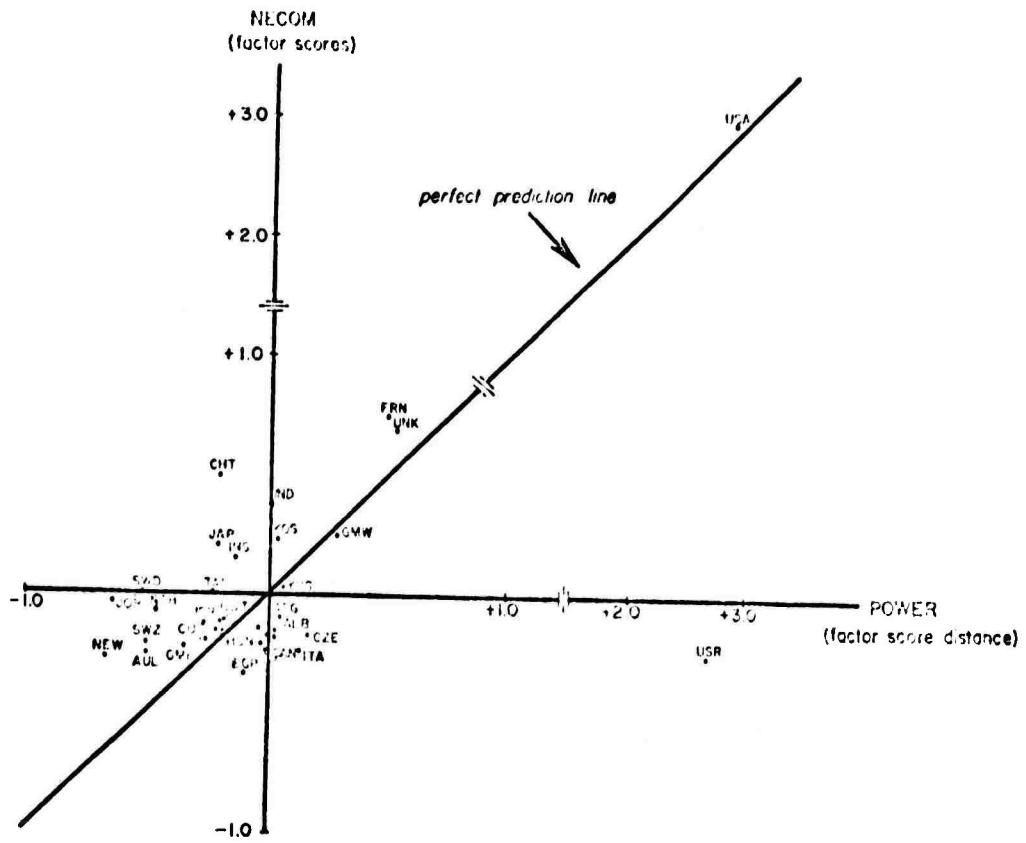


FIGURE 6  
CHINA'S NECOM VS. POWER DISTANCE, 1955  
(factor scores)

effect of high trade. In Figure 6, the dyads also roughly aligned along the perfect prediction line. This shows us that the pattern delineated shows the functional relationship between China's verbal hostility and the power of the object nation.

To see the effect of the modification of the data on the delineated behavioral pattern, the corresponding structure equations resulted from all four data sets--original (O), transformed (T), reduced (R) and reduced and transformed (RT)--are presented in Table 15. Comparing the four equations, we can see some significant changes in the loadings from one equation to another, although the basic pattern relationships are similar.

The difference between the loadings of the original data and the transformed data especially was noticeable. The variate scores of each output indicated that the changes were mainly due to the extreme values of USA and USSR on NECOM and POWER. By reducing these values so that they are closer to the main group of objects by transformations, the effect of "big variance" on NECOM and POWER were "tamed." The contribution of TRADE, then, was increased relatively and the hidden contribution of political orientation (PORIE) in A-space emerged. For example, the same canonical relation of POWER↔NECOM linkage in T-55 study came out as the following:

$$58 \text{ NECOM} + 75 \text{ TRADE} + 80 \text{ POWER} - 43 \text{ PORIE} \quad (r = .96) \quad (26)$$

Comparing this equation (26) to the previous one (25), we need to change the verbal interpretation slightly: the more powerful the object nation is and the more it is oriented politically toward the

TABLE 15  
CANONICAL STRUCTURE EQUATIONS  
FOR CHINA'S INTERACTION BEHAVIOR (NECOM + TRADE)<sup>a</sup>

F A C T O R S	BEHAVIOR FACTORS										ATTRIBUTE DISTANCES										r <sup>c</sup>									
	T <sup>b</sup>	P	D	E	L	P	I	E	C	M	O	V	I	C	O	I	U	A	O	D		W	P	C	T	C	O	F	U	
1	0	-46									88					97														.59
9	T	75									58					80	43													.96
5	R	-50									-86					-96														.95
	RT		44								84					-79	-47													.95
1	0	-64									68					-80														.97
9	T	63									-55	-49				79														.95
3	R	-54									78					82														.97
	RT	-59									-52	-56				77											33			.96

<sup>a</sup>For computation, Charles Hall's CANONICAL program was used.

<sup>b</sup>These are factor label codes.

<sup>c</sup>Canonical correlations. All correlations are significant at the .0005 level.

<sup>d</sup>O = Original data (81 dyads), T = Transformed data (81 dyads), R = Reduced data (55 dyads), RT = Reduced and Transformed data (55 dyads).

<sup>e</sup>Only loadings that exceed .30 are given in the table. Signs are as appeared in the original computer outputs. Decimal points are removed.

non-Communist bloc, the more China tends to trade with the object and to direct more negative communication to the object.

The pattern was stable across time. The corresponding structure equation in the 1963 analysis was

$$68 \text{ NECOM} + 64 \text{ TRADE} + 80 \text{ POWER} \quad (r = .97) \quad (27)$$

Comparing the equation with the one for 1955 (equation 25), the pattern was the same, although the loadings were slightly changed and the canonical correlation dropped from .99 to .97. Considering the crudeness in the current data collecting procedure, the pattern is sufficiently stable across time. In Figure 7, the value of the behavioral variate of equation 27 was plotted against the value of the distance variate score for all dyads. Again as can be seen in the figure, the dyads aligned fairly well along the 45 degree line.

The finding of the strong linkage between NECOM and POWER exactly coincided with the findings of Rummel's previous work (Rummel, 1969b). Rummel's corresponding finding with 1955 data was, in terms of the structural equation,

$$100 \text{ Conflict} + -75 \text{ National Income} \quad (r = .97) \quad (28-a)$$

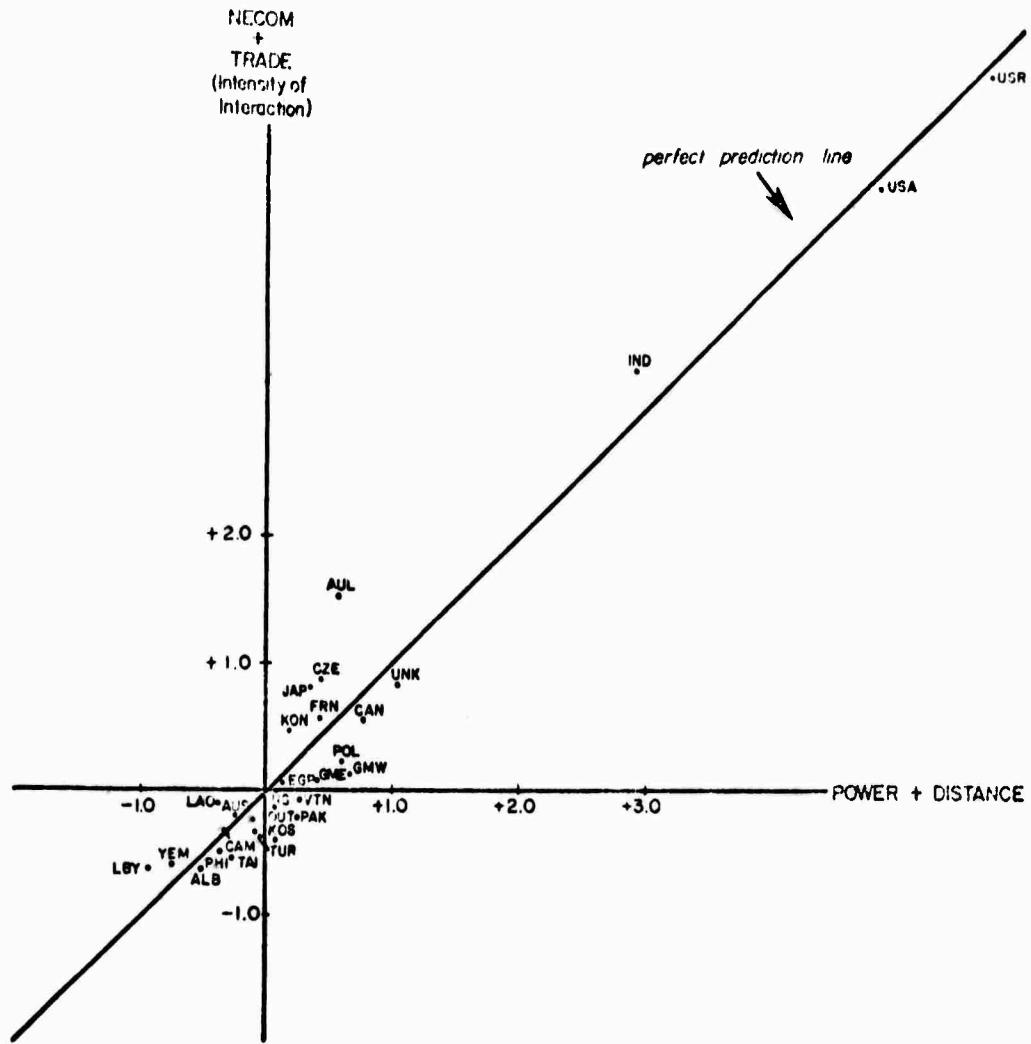


FIGURE 7  
CHINA'S JOINT BEHAVIOR OF NECOM + TRADE, 1963  
(canonical variate scores)

where the power disparity was measured in terms of distance in national income and the conflict may be regarded as the equivalent of NECOM of this study.<sup>134</sup>

Another similar finding was reported by Rummel in his recent study on U.S. foreign relations (Rummel, 1970b, pp. 54-5). The finding in the form of the structure equation was

$$81 \text{ WE} + 66 \text{ DE} + - 81 \text{ PO} \quad (r = .94) \quad (28-b)$$

where WE means Western European behavior (cooperative), DE stands for the deterrence pattern (conflict), and PO is the power distance vector. Although the term TRADE in equation 25 of this study is somewhat different from WE of 28-b, one thing is very similar between the two findings: both are "conflict + cooperation + power" type patterns.

It is also meaningful to compare the findings to some of the existing relevant theories. First, let us compare our results with

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<sup>134</sup>Note that "National Income" in the equation has a minus sign, while in equations 25-27 "POWER" has a plus sign. Although the results look different, in fact, the relations are similar, because in Rummel's study, the distance between the actor (U.S.) and the object was calculated as

$${}^a\text{China} - {}^a\text{object},$$

while in this study the distance was calculated as

$${}^a\text{object} - {}^a\text{China} .$$

The findings were similar for the 1963 data (Van Atta and Rummel, 1970). But this time instead of power distance (-.53), difference in political orientation (.84) appeared as the leading explanatory attribute distance. This result is similar to equation 26 above.

some of the propositions of the status theory.<sup>135</sup> Rummel combined two separate propositions<sup>136</sup> of Galtung's status theory as follows: "the distance of the object nation from U.S. (the actor) on power will contribute negatively to the joint cooperative and conflictual actions of the U.S. (the actor) toward that nation." In the form of the structure equation, this proposition was expressed as

$$gCO + hCF = -PB + k \quad (29)$$

where CO denoted the cooperative acts of the U.S. (the actor) toward an object nation, CF conflict, and PB distance on power bases. In other words, this equation says that "the joint amount of conflict and cooperative actions toward an object should depend on the power parity of the two nations" (Rummel, 1970b).

Considering that the U.S. is the most powerful nation, and that, therefore, distance from the U.S. on power bases means less power, we can interpret the statement for China as the following: "the more

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<sup>135</sup>Lagos, 1963; Galtung, 1966. For the propositions of status theory, see Rummel, 1970b, pp. 27-35.

<sup>136</sup>One was for cooperative behavior, and the other for conflict behavior. They were, in Rummel's modified expression, 1) "the distance of object nation from the actor on economic development and power bases dimensions of attribute space will contribute negatively to the relative cooperative actions of the actor toward that nation," and 2) "the distance of the object nation from the actor on economic development will contribute positively and the distance on power bases will contribute negatively to the relative conflict actions of the actor toward that nation." (Rummel, 1970b, pp. 32-33. "U.S." was replaced with "the actor" by me).

powerful the object nation is, the greater the joint amount of conflict and cooperative actions toward the object nation becomes." If we compare this statement with the findings in this study,<sup>137</sup> we can see that the two statements are the same. We, therefore, can conclude that the findings of this study strongly support this part of status theory.

At this point, however, we need to note that the confirmation is for the proposition of status theory which was reconstructed by Rummel and not the original propositions. For example, the propositions of cooperative behavior alone says that "equal status (power parity--for U.S. this means other Powers, while for China it means other middle powers) leads to high cooperation," which was obviously not the case for China.

This inconsistency comes from the fact that the meaning of parity of power differs from actor to actor depending upon the location of that actor on the power hierarchy: If the actor is the most powerful, the parity means "equally powerful"; if the actor is at the bottom of the hierarchy, then the same parity means "equally weak"; and if the actor is in the middle, it means "moderately powerful," and therefore, the disparity means both "more powerful" and "less powerful" simultaneously. In status theory, if we interpret the term disparity generally (as the third occasion in the above illustration), then, the proposition on conflict based on power parity was clearly derogated by the findings of this study.

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<sup>137</sup>If we can assume that the TRADE scores in this study measure the cooperative behavior of one nation toward the object nation.

For China's case, for example, if status theory is correct, then, the dyads must align along the V shape prediction line consisting of two 45 degree lines meeting at the origin of the axes, because disparity means both "more powerful" and "less powerful." As we can see in Figure 4, the dyads lay along a straight line, and did not support the notion. The finding supported only half of the proposition: "the power disparity on the positive side causes conflict." On the negative side of the power dimension, the result was the opposite: "The weaker the object nation is, the less NECOM and TRADE."

Currently, however, one important theorem is being developed by Rummel on this linkage of power distance and conflict. In his status-field theory<sup>138</sup> Rummel theorizes that the status dependent cooperation (CO) and conflict (CF) behavior of one nation toward another is a function of both the difference in economic development ( $d_1$ ) and power distances ( $d_2$ ), which is expressed in the following equation:

$$CO + CF = (\alpha_1^* - \alpha_1)d_1 - (\alpha_2^* + \alpha_2)d_2 \quad (29)$$

where  $\alpha_1^*$  and  $\alpha_2^*$  are cooperative parameters, and  $\alpha_1$  and  $\alpha_2$ , conflict parameters.

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<sup>138</sup>Expressed in an unpublished draft printed in 1971. As I mentioned earlier, field theory is an abstract theory from which no specific theorem on real world political phenomena is deducible. In status-field theory, Rummel intends to subsume most of the major theorems of various status theories within the basic framework of field theory. This theory is still in the developing stage and the author has specified that no part of the draft paper be quoted without permission (Rummel, 1971).

Then, Rummel argues that 1) for economically developed nations,  $(\alpha_1^* - \alpha_1)$  should be near zero while  $(\alpha_2 + \alpha_2^*)$  is near unity; and 2) for economically underdeveloped nations, both  $\alpha_2$  and  $\alpha_2^*$  are small (therefore,  $\alpha_2 + \alpha_2^*$  becomes near zero) and  $\alpha_1^*$  is high positive and  $\alpha_1$  is high negative (therefore,  $\alpha_1^* - \alpha_1$  turns out to be a large positive figure). This means that for the economically developed nations, the joint behavior of cooperation and conflict is to be explained mostly by power parity, while for economically underdeveloped nations, the same behavior is explained mostly by their difference in economic development.

With this new theoretical perspective, let us examine the findings of this study again.

China was a moderately developed nation. Her rank on the economic development dimension was slightly above the midpoint in both years. Therefore, in explaining China's joint behavior of cooperation and conflict (intensity of interaction), both the difference in economic development and power parity are expected to play roles. China, however, was a high power nation (on power dimension, her rank was ninth in 1955 and third in 1963). Thus, for China, the total sum of  $d_2$  (power distance) for all nations should be larger than that of  $d_1$  (difference in economic development) in equation 29. Therefore, the empirical pattern is to give more weight on power distance than on the difference in economic development. The finding of this study (equations 25-27) empirically confirms this logical deduction by showing high weights on power distance. Furthermore, with this new theoretical framework of status-field theory with its dual explanatory distances

(power and economic development), we can solve the inconsistency problem of the original status theory discussed above: power parity explains conflict only among the high powers. As mentioned above, China was a high power nation. Thus, China's intensity of interaction ( $CO + CF$ ) toward other economically developed powers should be very intense, because for those powers,  $d_2$  are very small and  $d_1$  is moderately large with large  $\alpha_1^*$  and small  $\alpha_1$ . As we can see in Figures 5 and 7, the findings of this study strongly support this argument. China's trade activities and negative communication toward USSR, USA, UNK, CAN, and FRN were very intense.

Following the same logic, from equation 29, we can expect China's interaction with the non-power nations which are also underdeveloped to be very low, because,  $d_2$  will be large and  $d_1$  is also moderately large, and together with  $d_1$  effect (with negative correlation) and  $d_2$  effect (with negative correlation), the total interaction score should be high negative (very low).

With nations which are highly developed and not powerful, such as AUL, CZE and JAP, Chinese interaction should be moderately more intense than estimated from the equations 25-27, because this time the effect of  $d_1$  is relatively strong and, therefore, the scores should be greater than the ones estimated from power distance alone. This expectation was met by the findings in Figure 7: the dyads involving AUL, CZE and JAP have positions fairly above the 45 degree line.

As a whole, the cooperation-conflict theorem of status-field theory explains well why power parity well explains the intensity of

interaction for the dyads including high power object nations, but not for those including weak underdeveloped nations.

Although the status-field theory is based on status theory, the derived theorem on the linkage between conflict and power parity also subsumes the theorem of the power transition theory of Organski.<sup>139</sup> In the power transition theory, conflict is said to be very likely when a challenging new power (next to the dominant power) is approaching the old-guard power in power capability.

From the status-field theory view, this means that  $d_2$  in equation 29 is very small (great power parity) and  $d_1$  is large (the challenger is less developed and tries to pull her up to the level of the dominant power by gaining power). Thus, with large  $\alpha_1^*$  and small  $\alpha_1$ , the interaction should be intense, and as indicated by large  $\alpha_1^*$ , the interaction is very conflictful. The finding, as I discussed above, was very supportive of this notion of conflict of the power transition theory: as seen in Figure 5 and 7, China-USA dyad, for example, shows intense interaction, while, in Figure 6, it was revealed that the interaction mainly consisted of conflict.

One more finding still needs some explanation: why both cooperation and conflict behavior together vary in the same direction instead of being inversely correlated? Apparently, cooperation and conflict seem to form a continuum, cooperation on one end and conflict on the other. But it was found in many empirical studies that these two

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<sup>139</sup>Organski (1968, p. 376): "...Thus, wars are most likely when there is an approaching balance of power between the dominant nation and a major challenger."

behaviors are mutually independent and do not form a continuum, or the two behaviors are not antipodes (Rummel, 1970b, p. 49). It has been further argued by Rummel that both of them are not behavior space dimensions, but both of them together load on one dimension which may be called cooperation-conflict dimension, or interaction dimension (See Figure 4).

The findings of this study (equations 25-27) strongly support the independence of cooperative and conflictful behavior. In all equations in this section, both NECOM and TRADE have high positive parameters, which means that they are not antipodes at all. The findings rather tell us that both NECOM and TRADE jointly form a pattern of behavior and are related to the power distances.

So far we have discussed China's interaction behavior pattern which comprises both negative communication and trade activities positively. To summarize: 1) China's negative communication behavior can be explained by the distance on the power dimension of the object nation from China; 2) If the power disparity is positive (more powerful than China), the negative communication value is proportional to the power distance, and if the power disparity is negative (weaker than China), then, the negative communication value is inversely proportional to the power distance; 3) trade (economic cooperation) is also largely explained by the power disparity and the degree of cooperation is proportional to the power capability of the object nations; and 4) conflict and cooperative behavior are not on the opposite ends of one continuum; they together form an interaction pattern.

## 9.2 Cold War Behavioral Pattern of China

The second behavioral pattern delineated by the canonical regression analysis with 1955 original data in a canonical structure form was

$$\begin{aligned} 65 \text{ TRADE} + 53 \text{ FDIPL} - 35 \text{ NECOM} + 76 \text{ PORIE} + 37 \text{ FCONF} \\ + 30 \text{ URAID} \quad (r = .95) \end{aligned} \quad (30)$$

which meant that China tended to trade more, to have more intense formal diplomatic relations and to have less hostile relations with the socialist camp which received aid from the Soviet Union.

The pattern was very salient in terms of variance tapped by the model: ninety percent of the total variance of the behavior ( $r = .95$ ) was contained in the model.

The pattern, as the interaction pattern discussed in the previous section, also comprises both cooperative behavior (TRADE and FDIPL) and conflict behavior (NECOM) together. This time, however, the relations between the two kinds of behavioral factors within the pattern is "subtractive" (in interaction pattern, they were additive). This means that the overall pattern score is determined by the difference between the cooperation score and the conflict score. The pattern score here is what was called "net cooperation index" by Park (Park, 1969).

Considering that the behavior depicted by the pattern is net cooperation between China and the object, and that the pattern is mostly explained by the difference in political orientation of the object nation from China, the pattern is named "cold war behavioral

pattern." By "cold war" I do not necessarily mean only the ideological war between the socialist camp led by the Soviet Union and the Western World. I use the term more broadly so that it also includes China's ideological struggle for indisputable hegemony in world politics, challenging both Western and Soviet dominance.

With this in mind, let us examine the development of the pattern over time. The corresponding cold war pattern, *i.e.*, cooperation (TRADE) - conflict (NECOM) pattern, took the following structure equation form with the original 1963 data.

$$67 \text{ TRADE} - 66 \text{ NECOM} \qquad (31) \\ + -80 \text{ CTRAD} + 39 \text{ USAID} + 31 \text{ PORIE} \quad (r = .92)$$

This time, on the right hand side of the equation, CTRAD (trade with communist countries) replaced PORIE (political orientation) with a reversed sign as the main explanatory factor and USAID (US aid received) appeared as a new supporting factor. The equation tells us that China, in 1963, tended to trade more with the nations which traded less with communist countries and which were under USA influence. The replacement of CTRAD with PORIE in the 1963 equation as a major explanatory variable clearly indicates the change in the nature of China's cold war. In 1955, China followed the Soviet Union's leadership in the cold war between Western powers and the overall communist camp; but in 1963, she already had launched her own cold war against both the old enemy, *i.e.*, the Western powers, and the new enemy, *i.e.*, the Soviet Union and its satellites. The pattern showed clearly the direction of the Chinese

movement toward a world socialist revolution: She avoided the Soviet sphere of influence, and directly aimed at "new" areas under American influence.

To show the effect of the modification of the data on the pattern, the corresponding equations delineated with other data sets (T, R, and RT) were presented along with the original equation in Table 16. To show the fit of the model to the data, the cold war behavioral pattern scores (TRADE - NECOM) were plotted against the political orientation distance scores (CTRAD) in Figure 8.

In this pattern, trade activities were taken as an indicator of the cooperative behavior of China. Then, can we say that trade reflects the policy attitude of the Chinese government toward other nations? The answer is yes.

In many studies in the field of international relations, trade has been used to indicate how salient one nation is to another.<sup>140</sup> This is partly because trade can be regarded as a political instrument with which one nation can control another. Directing trade affords a nation two kinds of advantages. First, trade is an instrument of cultural and political penetration. Second, if one nation can achieve a decisive position as a supplier or customer of another, it can exercise a critical influence on the political and economic policies of the other.<sup>141</sup>

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<sup>140</sup>The number of studies which used trade as an indicator of the degree of transactions between nations is innumerable, especially in the field of integration studies. See, for example, Deutsch, 1957; Savage and Deutsch, 1960; Kitzinger, 1961; Brans, 1966 and Russett, 1967.

<sup>141</sup>For a detailed discussion on the political implication of directed trade, see Padelford and Lincoln, 1962, pp. 413-415.

TABLE 16  
CANONICAL STRUCTURE EQUATIONS  
FOR CHINA'S COLD WAR BEHAVIOR (TRADE - NECCN)<sup>a</sup>

FACTOR	BEHAVIOR FACTORS										ATTRIBUTE DISTANCES										R <sup>c</sup>						
	T <sup>b</sup>	R	A	D	P	I	E	N	C	V	P	P	D	E	S	A	U	A	O	D		I	W	P	C	F	U
1	0 <sup>d</sup>	65	53				35					76				30											.95
2																											.92
3	T		-53				-68		36		-46					37											.97
4	R	59	61				-39				79																.97
5	RT	-72	57								47																.97
6	O																										.92
7	T																										.80
8	R																										.90
9	RT																										.84

<sup>a</sup>For computation, Charles Wall's CANONICAL program was used.

<sup>b</sup>These are factor label codes.

<sup>c</sup>Canonical correlations. All correlations are significant at the .0005 level.

<sup>d</sup>O = Original data (61 dyads), T = Transformed data (31 dyads), R = Reduced data (55 dyads), RT = Reduced and Transformed data (55 dyads).

<sup>e</sup>Only loadings that exceed .30 are given in the table. Signs are as appeared in the original computer outputs. Decimal points are removed.

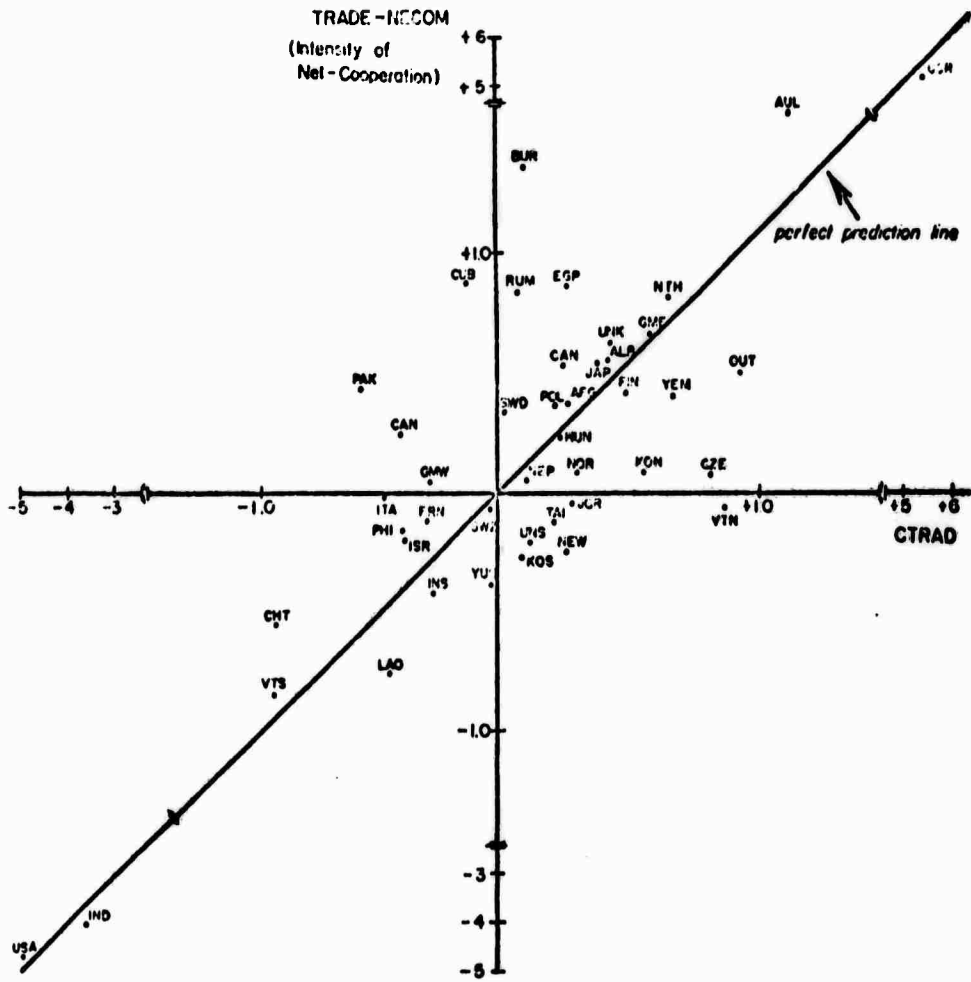


FIGURE 8  
CHINA'S COLD WAR BEHAVIOR (TRADE-NECOM)  
(canonical variate scores)

Furthermore, the reputation of trade as a valuable indicator was reinforced by the availability and relative accuracy of the data.

In addition, the study of trade has a special meaning for China, because her trade is not merely controlled but directly operated by the government. Thus, trade for China is much more sensitive to politics than for the free nations.

In this pattern, the pattern score is a function of TRADE and NECOM. That is, the score is the remnant value of TRADE after the NECOM value has been subtracted. Therefore, a dyad will have the maximum score when the object nation trades most with China while it receives the least negative communication from China. On the other hand, a dyad will have the minimum pattern score in this cold war pattern when the object in the dyad does not trade with China and receives the greatest negative communication from China.

Thus, we can formulate a scale for the cold war pattern score for a dyad as drawn in Figure 9. As we can see from the figure, the dyad which has a high pattern score does not necessarily have high trade. A big trade partner may have a medium pattern score if she receives high negative communication from China.

If we compare this pattern to China's power-interaction pattern discussed in Section 9.1, we can have greater insight into the nature of China's trade, because both patterns comprise TRADE and NECOM. As discussed in Section 9.1, in that power-interaction model,  $\text{TRADE} + \text{NECOM}$  were explained by power distance. But, as discussed above, in the cold war pattern  $\text{TRADE} - \text{NECOM}$  is explained by the difference in political

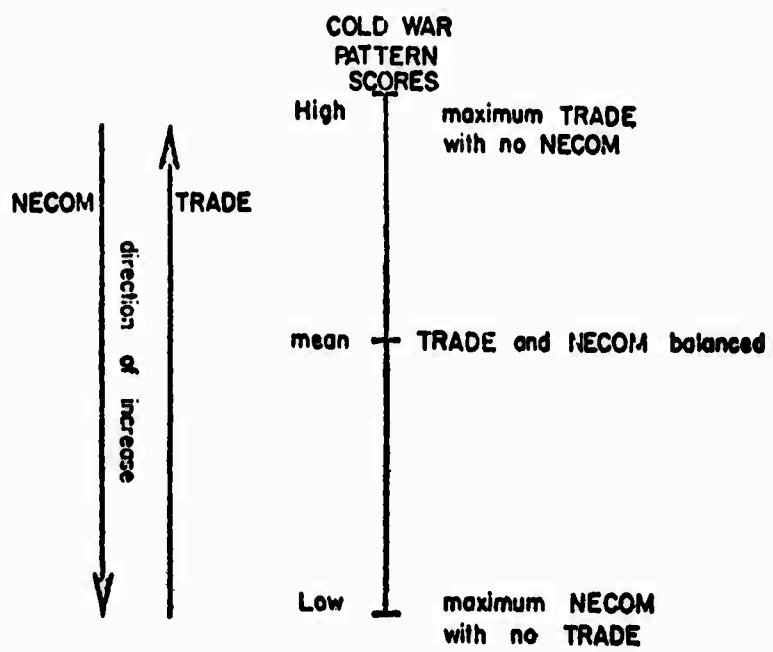


FIGURE 9  
SCALE FOR COLD WAR PATTERN SCORES

orientation. This suggests to us that the same trade activity is explained by different attribute distances in different contexts.

Then, in what context is China's trade involved in the interaction pattern as TRADE + NECOM? When is the cold war pattern TRADE - NECOM? My argument is that the decision makers have different decision patterns formulating foreign policy with regard to trade and verbal attack: One is a "power pattern" where "power distance" is the criterion; and the other, may be called a "political orientation pattern." In application of this "double pattern system," it seems that if the object's power is great enough to be considered as a threat to China, she applied the first system; but, if the "power" of the object is not so significant, she applied the second model.

To understand this dual system, it may be helpful to consider two different characteristics of China's trade. For China, as a country, trade is an economic necessity: For example, she has to import machines, tools, etc., to achieve industrialization. On the other hand, as will be discussed in Sections 9.3 and 9.4, China as the leader of the world social revolution, utilizes trade as an instrument for political penetration. A careful examination of the items China traded with each object nation<sup>142</sup> shows these two clearly different kinds of trade. Thus, the first kind of trade, "trade for necessity" takes the form of TRADE + NECOM pattern with POWER as the leading

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<sup>142</sup>See Eckstein, 1966, section 4 of Chapter 4, "Commodity Composition of Communist China's Foreign Trade," pp. 103-17. Especially, Table 4-5 (pp. 106-7) and Table 4-7 (pp. 114-5). See also Sawyer, 1966, Chapter 3, "Commodity Patterns" (pp. 25-40).

explanatory variable, while the second kind of trade, "trade as a political tool" takes the form of TRADE - NECOM pattern with PORIE as the leading explanatory variable.

The relations between the interaction pattern (TRADE + NECOM) and the cold war pattern (TRADE - NECOM) can be clarified if we rely on the status-field theory discussed in Section 9.1. When I discussed the Cooperation (CO) + Conflict (CF) pattern of Rummel's status-field theory in Section 9.1, I also reviewed his new concept of an interaction dimension which is loaded highly by the two independent "clusters" of variables: CO and CF. Now, I will extend this concept to another pattern of CO - CF.

1) Let us suppose that TRADE (CO) and NECOM (CF) are independent, and the joint interaction dimension (I) passes between the two vector clusters (see Figure 10). Then any dyad ( $b_{i \rightarrow j}$ ) in the space within the two orthogonal vectors, TRADE and NECOM, has a value on I dimension (i) which is the sum of the value on TRADE vector (t) and that on NECOM vector (n);  $i = t + n$ .

2) If we extend the NECOM vector in the direction opposite the origin (0), this negative NECOM vector ( $\bar{N}$ ) and TRADE vector again bound a space. If we draw one new dimensional vector which is orthogonal to I, and name it P, then the P will pass through this space bounded by  $\bar{N}$  and T. Any dyad in this space will have a value on this P dimensional vector (p) which is the sum of the value on  $\bar{N}$  (-n) and T (t):  $p = t - n$ .

3) From Figure 10, we can easily say that the dyad in T and N boundary has always a greater i value than p value, and the dyad in  $\bar{N}$

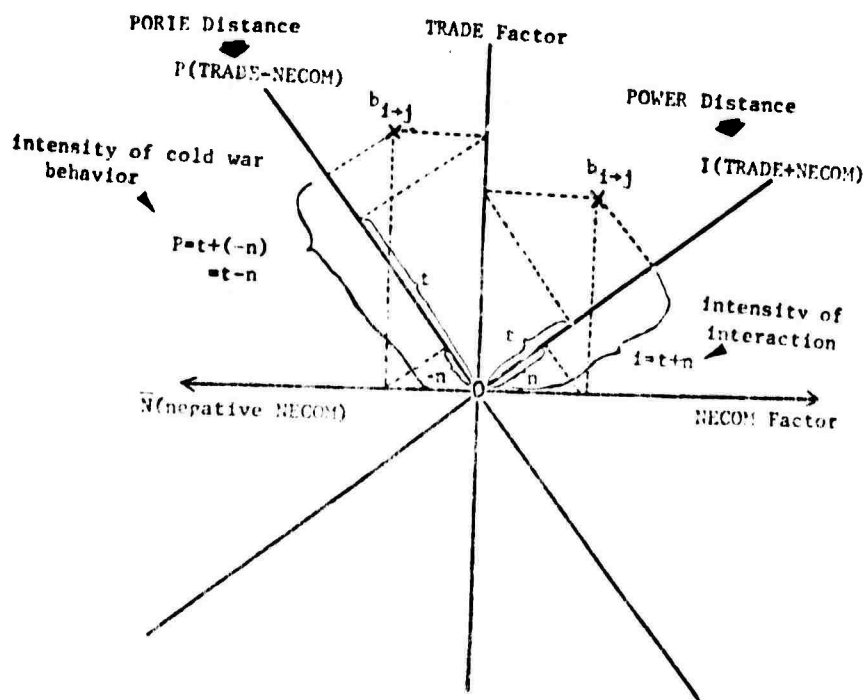


FIGURE 10

COLD WAR PATTERN (TRADE-NECOM)  
COMPARED TO INTERACTION PATTERN (NECOM+TRADE)

and T boundary has always a greater p value than i value.

4) Suppose the I behavior dimension is highly correlated with the power distance dimension in A-space and P with the political orientation difference dimension, respectively. Then, for each dyad,  $i (= t + n)$  is better explained by power distance, than by political orientation difference, while  $p (= t - n)$  is better explained by the political orientation difference than by the power distance.

From this, we have two different behavior patterns:  $\text{TRADE} + \text{NECOM} = f(\text{power distance})$ , which is my "power pattern," and  $\text{TRADE} - \text{NECOM} = f(\text{political orientation difference})$ , which is my "political orientation pattern."<sup>143</sup>

### 9.3 Formal Diplomacy of China

Formal diplomacy in this study is defined as "the behavior of establishing diplomatic relations with other nations and maintaining those relations." The formal diplomacy factor emerged distinctly from the factor analyses of B-space in all four parallel data sets for both years, with DIPFP (diplomat sent from Peking) and DIPTP (diplomat to Peking) as the high loading variables.<sup>144</sup>

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<sup>143</sup>If we express the two patterns in one equation, we have the cooperation and conflict theorem of Rummel's status-field theory. Instead of political orientation, let us put economic development (ED). Then, the above two equations will be  $\text{CO} + \text{CF} = f(\text{PD})$ , and  $\text{CO} - \text{CF} = f(\text{ED})$ , where PD is power distance. If we add the two equations, then,  $\text{CO} = f(\text{PD} + \text{ED})$ , and if we subtract the second from the first,  $\text{CF} = f(\text{PD} - \text{ED})$ . By giving some adequate parameters, and rearranging them, this will be easily transformed into  $\text{CO} + \text{CF} = (\alpha_1 * - \alpha_1)d_1 - (\alpha_2 * + \alpha_2)d_2$ .

<sup>144</sup>The loadings (original data set) were .90 for both DIPFP and DIPTP in 1955 and .96 for both variables in 1963.

The pattern found for China's formal diplomacy, in the form of the structure equation,<sup>145</sup> was

$$\begin{aligned} & 51 \text{ FDIPL} + 42 \text{ TRADE} + 50 \text{ ECAID} + 37 \text{ CONGO} \\ & + 43 \text{ PORIE} - 34 \text{ WESTC} - 39 \text{ URAID} - 44 \text{ ORIEN} - 44 \text{ DIVER} \quad (r = .73) \end{aligned} \quad (32)$$

Although seemingly complicated, since there are so many factors involved in both sides of the equation, a closer examination of the relationships reveals a simple linkage. First, the left side factors are all related to the administrative behavior of maintaining friendship in the world community. FDIPL and CONGO are purely administrative behaviors, while TRADE and ECAID are supporting behaviors to achieve friendship. Second, the right side factors (attribute distance) comprise two groups: cold war group identifiers (PORIE, WESTC, URAID), and the indicators of Asian neighbors (ORIEN, DIVER).

A verbal interpretation of the pattern, then, is that the stronger the object nation's ties to the Communist camp and the stronger her cultural affinity to China, the stronger are the formal diplomatic ties with China.

This time the strength of the pattern linkage was not so strong. The  $r^2$  was .53 and this means that a little more than half of the total variance was accounted for by the relations.

Although the basic forms of the relationship were similar, one noticeable shift of factors was detected between the equations of 1955 and 1963. The TRADE factor disappeared in the 1963 equation. As men-

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<sup>145</sup>For the equations with other data sets, see Table 17.

TABLE 17  
CANONICAL STRUCTURE EQUATIONS  
FOR CHINA'S FOREIGN DIPLOMACY<sup>a</sup>

F A C T O R S	BEHAVIOR FACTORS										ATTRIBUTE DISTANCES										R <sup>c</sup>									
	T <sup>b</sup>	F	D	A	D	I	P	I	E	C	N	O	V	C	O	I	U	A	G	R		O	D	I	W	P	C	C	F	U
1	0	-42 <sup>e</sup>	51	50	37	43	-34	-39	44	44	44	36	-40	-30	36	30	43	-39	-38	-32	-40	-38	-48	30	30	30	30	30	30	.73
9	T	-30	-69	-48	-40	36	-40	-40	-30	-30	-30	36	-40	-30	36	30	36	-40	-30	36	30	30	30	30	30	30	30	30	30	.37 <sup>e</sup>
5	R	-50	61	-45	69	30	43	-39	55	55	55	30	43	-39	30	30	30	43	-39	-38	-40	-38	-48	30	30	30	30	30	30	.79
RT	RT	-41	-39	38	69	30	43	-39	-38	-32	-40	-38	-48	-38	-32	-40	-38	-40	-38	-32	-40	-38	-48	30	30	30	30	30	30	.74
1	O	-76	32	38	38	-69			42			-69			42															.85
9	T	83	-31			-84						-84																		.88
6	R	49	-67	39	37	-57	-34					-57	-34																	.94
RT	RT	-93				82	-35					82	-35																	.93

<sup>a</sup>For computation, Charles Hall's CANONICAL program was used.

<sup>b</sup>These are factor label codes.

<sup>c</sup>Canonical correlations. The correlation with \* is not significant at the .25 level. All others are significant at the .0005 level.

<sup>d</sup>O = Original data (31 dyads), T = Transformed data (81 dyads), R = Reduced data (55 dyads), RT = Reduced and Transformed data (55 dyads).

<sup>e</sup>Only loadings that exceed .30 are given in the table. Signs are as appeared in the original computer outputs. Decimal points are removed.

tioned elsewhere, this shift appears to be the result of the "*cheng-ching fen-li*" policy of "division of politics and business," strongly advocated by the Chinese policy makers. The equation for 1963 was

$$\begin{aligned} 76 \text{ FDIPL} + 32 \text{ ECATL} + 38 \text{ CONGO} \\ + 69 \text{ PORIE} + 42 \text{ ORIEA} \quad (r = .85) \end{aligned} \quad (33)$$

When China was a young country (1952), she was contained in the sphere of international Communism. Recognized mainly by the other colleagues of the Socialist Camp, she generally traded with the members of the bloc. In the pattern, therefore, FDIPL and TRADE appeared in one equation. In 1963, however, China was mature enough to claim her own identity in the world community. No longer a puppet of international Communism, she began to trade for necessity, ignoring the political orientation of the object nation. The "*cheng-ching fen-li*" policy was convenient for her under these circumstances as it always has been for similar cases in Oriental culture.<sup>146</sup>

Formal diplomacy has a special meaning for China, somewhat different from other European countries. Historically, China's foreign policy centered around formal diplomatic relations. The core of the well-known tributary system of China's past dynasties (especially of Ming and Ch'ing) had been the maintenance of formal supremacy of the Chinese court over other nations, even though this has not necessarily

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<sup>146</sup>For instance, Japan maintains the same policy toward all divided countries: China, Korea, Vietnam and Germany. Inoguchi's view was different (Inoguchi, 1970, p.50). He viewed that China's trade was determined by political consideration. His view was that China's dominant policy on trade was "*cheng-ching hu-ke-fen*" (indivisibility of economics from politics) instead of the "*cheng-ching fen-li*" policy.

provided economic advantages or other benefits to China. The same principal had been retained after 1949.<sup>147</sup>

Considering their emphasis on formal diplomatic relations, we can understand why China has maintained and still maintains stubbornly the "Hallstein Doctrine," which in China's case means "she will not establish diplomatic relations with those who recognize the Republic of China (Taiwan) as a separate entity other than the not-yet-liberated portion of China." In this vein, we must understand that her formal diplomatic behavior toward other nations has much more political implications rather than a mere administrative behavior.

In the formal diplomacy pattern of China, again we can spot the significant impact of the skewed nature of the original data. As we can see in Table 17, the differences among the patterns delineated by each of the four parallel data sets were remarkable, although the major forms of pattern relationship was retained. Presentation of one clearer pattern will have sense in order to see the effect of the extreme values. The same equation for the 1963 space with the RT data was

$$93 \text{ FDIPL} + 82 \text{ PORIE} - 35 \text{ WESTC} \quad (r = .93) \quad (34)$$

This is simpler than the equation with the original data presented earlier. This time the data was transformed and the number of cases was reduced by excluding "low-transaction" objects. The rela-

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<sup>147</sup>The core concept of the Ch'ing tributary system and its relationship to Communist China's foreign policy, can be found in Rhee, "The Ch'ing Tributary System and the Foreign Policy of the People's Republic of China," unpublished monograph, 1969.

tion delineated by this equation may be said to be the clearest in the sense that the effect of the extreme values and low variance problem were simultaneously removed. The result tells us that China's formal diplomatic behavior can be explained by the political orientation of the object nation. The  $r$  for this equation was .93 which tells us that more than 86 percent of the total variance was accounted for by the model.

For a graphic check of the pattern relationship depicted by this equation, the predicted value of the formal diplomacy dimension for some interesting nations were plotted with the combined score of political orientation (PORIE) and Western culture (WESTC) dimensions in Figure 11 (RT-63 data were used).

In conjunction with formal diplomacy, it is worthwhile to look at China's activity in the realm of international organizations, since participation in international organization has also been regarded widely as an important administrative behavior<sup>148</sup> which keeps channels open for a nation to cooperate with others.

The list of NGOs of which China was a member shows that China was not active in international organizations.<sup>149</sup> For instance, in 1963 out of a total of 1722 NGOs, China had membership only in 57 (in

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<sup>148</sup>International organizations in this study refer to only NGOs. During the years covered by this study, China was a member of only one IGO, the Joint Nuclear Research Institute organized by seven Communist countries in 1956. Therefore, IGO was excluded from the study.

<sup>149</sup>See Appendix I-B, the raw data table.

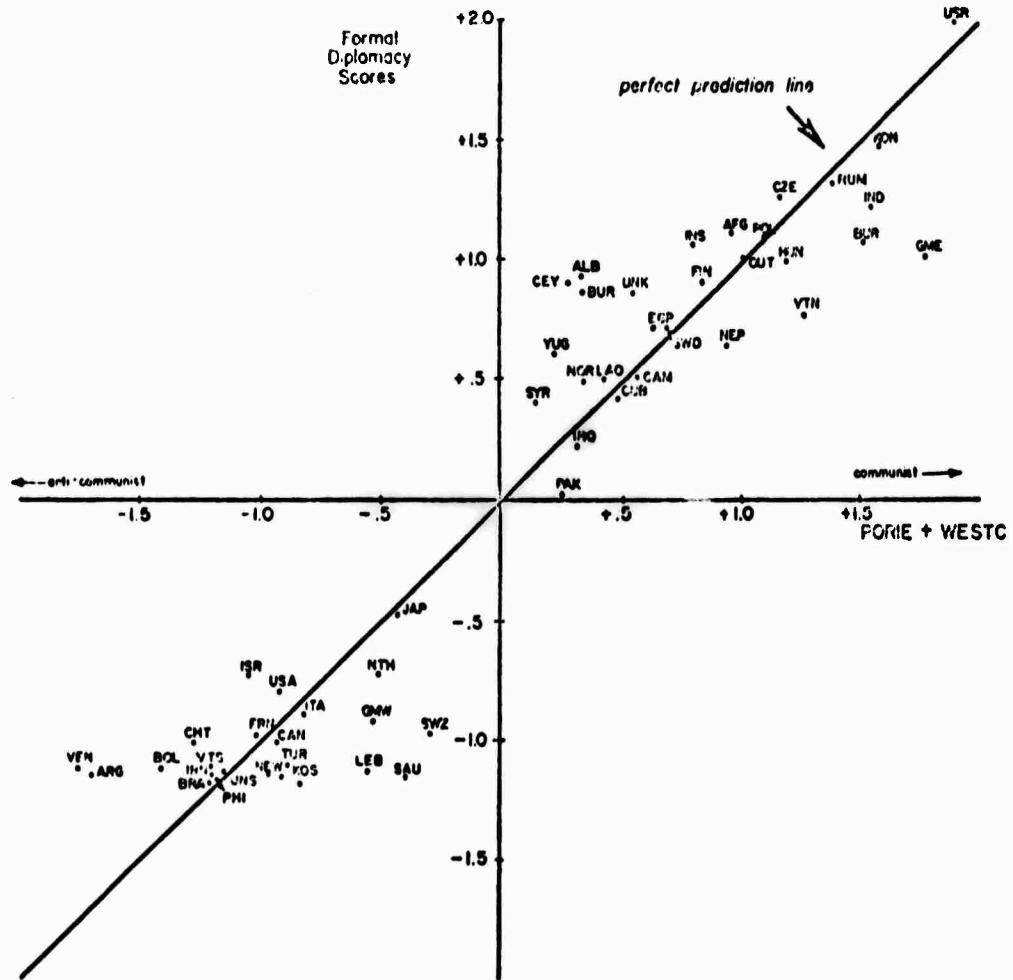


FIGURE 11  
 CHINA'S FORMAL DIPLOMACY  
 (canonical variate scores)

1955, 22 out of 1221). Furthermore, these NGOs were mostly sports-related ones. It is difficult to speculate why China did not show interest in international organizations. One possible conjecture is that China was not able to participate because of the objections of the Western bloc nations. Most of the international organizations had been established long before China became independent. The Republic of China (CHT), with support from the Western powers such as USA and UNK, has been an active participant in these organizations, and has consistently blocked China's entry.

The results of the canonical analysis indirectly supported this view (see Table 18). The results of the canonical analysis of the 1955 original data was

$$\begin{aligned} 75 \text{ CONGO} + 46 \text{ VISIT} + 35 \text{ TRADE} \\ + 53 \text{ DEVEL} + 42 \text{ WELFA} - 40 \text{ DIVER} \quad (r = .58) \end{aligned} \quad (35)$$

This meant that "the more a nation is developed (DEVEL and WELFA) the more memberships in NGO she shares with China." Considering that the absolute frequency of NGO memberships of a nation is directly proportional to her economic development, it can be expected that China would share more memberships in NGOs with wealthy, developed nations. Therefore, the finding does not mean much for China's foreign behavior.



In 1963, the results of the analysis were almost similar to that of 1955. The equation was,

$$80 \text{ CONGO} + 42 \text{ FDIPL} + 54 \text{ DEVEL} + 43 \text{ PORIE} + 39 \text{ WELFA} - 31 \text{ POWER} \quad (r = .86) \quad (36)$$

Again, the same tendency appeared; the more powerful, wealthier, and developed nations had more co-membership with China in NGOs. Only PORIE on the right hand side of the equation needs to be explained; China was better accepted by those NGOs where more socialist countries were participating.

#### 9.4 Informal Diplomacy of China

Another important aspect of China's foreign policy was her informal diplomacy--diplomacy with the non-governing political party of the object nation.

One of the indisputable objectives of China's long-term foreign policy has been to spread communism, eventually, to achieve a world-

wide "social revolution."<sup>150</sup> Furthermore, China has wanted to play a leading role in the process of this "socialist construction,"<sup>151</sup> and has insisted that other nations model their revolution after the Chinese "prototype."<sup>152</sup> This long-range aim of China's foreign policy was based on the Chinese communists' belief in the historical

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<sup>150</sup>This basic theme of China's foreign policy goal was expressed by Mao Tse-tung himself, as early as in 1949, saying that "...we must unite in a common struggle with those nations of the world who treat us on the basis of equality and with the people of all countries. This is to ally ourselves with the Soviet Union, to ally ourselves with all the New Democratic countries, and to ally ourselves with the proletariat and the broad masses of the people in other countries, to form an international united front ... in order to destroy imperialism and its running dogs." (Mao Tse-tung, "On the People's Dictatorship," delivered on July 1st, 1949. The English translation was taken from the *China Digest*, Vol. VI, No. 7). Halpern also clarified the long-term aim of China's foreign policy: "...to free China from foreign control and to make China once again great are the purposes of Chinese communist, as well as of the other Chinese governments. But in the communist's view, China can be freed only by associating herself with a world revolutionary movement aimed at transforming all existing societies. Further, in their view, China's greatness can be restored or assured only by her effective participation in this world movement ... The long-range aim of the Chinese communists, is not merely to get along in the world claiming for their country as much respect as the conditions let them attain. They aim beyond that to transform the world and to dictate the forms of organization of other societies into proletariat world order." (Halpern, 1968, pp. 2-3). See also Barnett, 1962, p. 85, Hinton, 1966, pp. 117-8, and Boyd, 1962, p. 84.

<sup>151</sup>Hinton, *Ibid.*, pp. 69, 117. Mao Tse-tung wrote "the Chinese revolution would exert a far-reaching influence on the revolution in the East as well as in the whole world" (*Selected Works*, Vol. I, p. 191). See also Boyd, *ibid.*, p. 84.

<sup>152</sup>Hinton, *ibid.*, p. 117: "The CPC (Communist Party of China) certainly aspires to provide a 'model,' or example, and if possible a degree of leadership, for the whole of the underdeveloped areas (the 'oppressed nations')." "

inevitability of the coming of a new world.<sup>153</sup> Mao Tse-tung stated that "...in the end, the socialist system will replace the capitalist system. This is an objective law independent of human will. No matter how hard the reactionaries try to prevent the advance of the wheel of history, revolution will take place sooner or later and will surely triumph."<sup>154</sup> This kind of belief, of course, is a vision, not a policy or strategy. But, a vision, seriously believed, can affect policy choice, and the effect of this vision can be reflected in their strategy.

To promote the expansion of communism in "semi-colonial" areas, the Chinese have employed first a strategy of protracted struggle, "which is based on a belief in the ultimate success of persistent, cautious and flexible aggression against the imperialist countries."<sup>155</sup> As one of the instruments to carry out this struggle, she has made great use of "people's diplomacy," which is a non-formal, people-to-people (actually the Chinese government and the communist parties in non-communist countries) diplomacy as well as direct opposition to the West.<sup>156</sup> Since her independence, China has maintained a liaison with

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<sup>153</sup>"Chinese Communists accept as articles of faith the basic Marxist concepts of dialectical and historical materialism, world-wide class struggle, and the inevitable overthrow of 'decaying capitalism' by the 'proletariat' of all countries" (Barnett, 1960, p. 68).

<sup>154</sup>Speech delivered on November 6th, 1957, in Moscow to the Supreme Soviet of the U.S.S.R., *Current Background*, No. 480, November 13, 1957.

<sup>155</sup>Boyd, *op. cit.*, p. 90.

<sup>156</sup>See Boyd, *ibid.*, p. 91, and Hinton, *op. cit.*, p. 119.

most foreign communist parties, "by both covert and overt means."<sup>157</sup>

The basic dimension, "informal diplomacy," had as its highest loading variable PNOVT<sup>158</sup> which was measured by the frequency of unofficial political visits from/to the object nations. Here "unofficial" means that the interaction was with non-ruling political parties in the object nations. Other variables loading highly on this factor were ECOVT (.66 in 1955, .74 in 1963) and ECOVF (.83 in 1955, .94 in 1963). As I argued elsewhere, China maintains a "*cheng-ching fen-li*" policy. One way of implementing such a policy is to trade only with the non-governmental members of the Western countries. As a result, most visitors came for economic reasons acting in a private capacity, providing a nice cover for informal diplomacy. Thus, in many cases, the leaders of non-ruling communist parties in the West were able to visit China for "business purposes."<sup>159</sup> If this is true, then, it explains why PNOVT clustered with ECOVT and ECOVF in the same factor group.

Comparing the two time points, 1955 and 1963, there was a noticeable shift of variables from the TRADE factor to the INDIP factor. That is, CULVT (.66), CULVF (.88) and CONCN (.66) which originally loaded

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<sup>157</sup>Hinton, *ibid.*, p. 120. For detailed interaction of the Chinese Communist Party with other communist parties, see Barnett, 1960, Appendix, "Peking and the Communist Parties of Asia" (pp. 476-501).

<sup>158</sup>The loading was .86 in 1955 and .88 in 1963. For other data sets, see Appendix II-B.

<sup>159</sup>Scrutinizing the news articles in *Jen-min Jih-pao*, for instance, I found that, for most Japanese communist party leaders who visited China, the announced purposes of their tour were business negotiations for a certain trading company or industrial sightseeing.

highly on the TRADE dimension in 1955, loaded highly on the INDIP factor in 1963.

As discussed in 9.1, the shift can be explained in the following way: In 1955 when China was young, decision makers were not prepared to play the sophisticated diplomatic game, and as a result, cultural visits and newspaper coverage<sup>160</sup> were naturally oriented, without any manipulative considerations, toward friendly nations (e.g. the Old-Guards in the socialist camp). In 1963, however, being already mature enough to launch skillful diplomatic campaigns, China's policy makers instrumentalized cultural visits and newspaper coverage as a tool for supporting informal diplomacy. With these slightly differing inner structures of the INDIP factors in 1955 and 1963 in mind, let us examine the structure equations that include INDIP in the set of behavioral combinations (for the equations with other data sets, see Table 19).

The equation for 1955 original data was

$$\begin{aligned} 89 \text{ INDIP} + 32 \text{ FDIPL} &= - 50 \text{ AGRIC} - 37 \text{ ORIEN} - 37 \text{ URAID} \\ &+ 36 \text{ CTRAD} + 35 \text{ PORIE} \quad (r = .44) \end{aligned} \quad (37)$$

First, in B-space, China's INDIP behavior was partly linked to her FDIPL behavior, which was also explicable in terms of her lack of diplomatic skill as I mentioned above. Secondly, in A-space, the highest weighting was on AGRIC (.50), the agricultural characteristics of the object

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<sup>160</sup>Note that the *Jen-min Jih-pao* (The People's Daily), which was used as data source in this study, is published by the Committee of Party Paper (Tang Pao) which is supervised by the Central Political Bureau of the Chinese Communist Party. For details, see Chiang, 1960, p. 389.

TABLE 19  
CANONICAL STRUCTURE EQUATIONS  
FOR CHINA'S IMPERIAL DIPLOMACY<sup>a</sup>

F A C T O R S	BEHAVIOR FACTORS										ATTRIBUTE DISTANCES										R <sup>c</sup>				
	F 32 <sup>d</sup>	R -15	A -71	D -30	I 89	E 64	M -34	N 36	C 36	V -37	U 34	A -50	A -37	O -45	D -37	W 36	U 56	A -60	D -37	W 37		U 30	A -36	D -37	
1	0 <sup>e</sup>																								.44 <sup>a</sup>
2																									.55 <sup>a</sup>
3																									.46
4																									.49
5																									.40
6																									.38
7																									.47
8																									.44

<sup>a</sup>For computation, Charles Wall's CANONICAL program was used.

<sup>b</sup>These are factor label codes.

<sup>c</sup>Canonical correlations. The correlations with \* are significant at the .10 level. Others are not significant.

<sup>d</sup>0 = Original data (51 dyads), 1 = Transformed data (51 dyads), R = Reduced data (55 dyads), RT = Reduced and Transformed data (55 dyads).

<sup>e</sup>Only loadings that exceed .30 are given in the table. Signs are as appeared in the original computer outputs. Decimal points are removed.

nation, followed by ORIEN (.37). These two factors together imply that the targets of China's informal diplomacy were her "underdeveloped agricultural Asian neighbors" rather than other industrial Western countries. This finding is interesting, because this exactly supports the proclaimed "periphery first" strategy of Mao Tse-tung's world communist revolution, which distinguishes Mao from Marx-Engels.<sup>161</sup>

In A-space, there were three more factors which were all indicators of the object nation's relation with the socialist camp (URAI, CTRAD and PORIE), that is, the less the influence from the Old-Guard socialist (USR) on the object nations, the more the informal diplomatic connection China has with them. These factors, then, just reinforced the effect of AGRIC and ORIEN.

The pattern was not salient in terms of the canonical correlation. The correlation was .44, which means that the pattern accounted for less than twenty percent of the total variance.<sup>162</sup> Furthermore, the pattern disappeared in 1963. As we can see in Table 19, there is a corresponding pattern equation. The correlation, however, was too low (.40) and statistically non-significant.<sup>163</sup> This implies that the informal diplomacy pattern discussed in this section is unreliable for

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<sup>161</sup>Mao praised Lenin's idea of the "East Round-About Strategy" which said "...the road to Paris is via Peking; liberation of the West is after that of the East; and the road to world revolution is through the East not through the West" (Kim, 1964, p. 33).

<sup>162</sup>The correlation was significant at .10.

<sup>163</sup>The Z value was -0.5. With 18 degrees of freedom, significant Z value at .10 is 1.310. See Table 13-2, 0-6.

practical use, although the finding provides us a suggestive model for China's informal diplomacy.

#### 9.5 Penetration Policy of China

Since the end of World War II in the international political scene, economic aid and political visits by high ranking political leaders have been the most common way in which the major powers wooed the developing nations. Economic aid ties a recipient nation to her donor, and political visits by a leader of the powers assure the recipient of their security.

China, as a power, was not an exception. As a pre-landing salvo for her next diplomatic manoeuvre, China usually first utilized informal diplomacy, followed by the establishment of formal diplomatic relations. Then, to tie the object into her orbit, she gave economic aid and exchanged visits by high ranking officials including the head of the government.

Considering Chinese backwardness in economic growth, the decision to give aid must have been much more difficult for her to make than for other powers. Thus, we can say that China's decision was the result of a careful calculation of her long-range policy and, therefore, should be regarded as a very important signal of her future intentions. Thus the ECAID scores can be considered to be a useful indicator of China's strong determination for political penetration.

The delineated pattern for China's penetration policy behavior from 1955 data (for the equations with other data sets, see Table 20) was

$$63 \text{ ECAID} + 57 \text{ VISIT} + 31 \text{ CONGO} + 30 \text{ FDIPL} + 56 \text{ FCONF} + \\ 52 \text{ URAID} - 43 \text{ ORIEN} - 36 \text{ AGRIC} + 33 \text{ CTRAD} \quad (r = .87) \quad (38)$$

which may be interpreted verbally as the following: China's penetration policy targets were chosen to include Asian agricultural neighbors (ORIEN, AGRIC) where the influence by the Soviet Union was relatively low (URAID, CTRAD), who had unstable relations with other nations (FCONF).

The appearance of FDIPL and CONGO on the left hand side of the equation indicated that in 1955, China was still in the stage of soliciting other nations for diplomatic recognition and political tools such as CONGO and VISIT were utilized for that purpose. In this sense, it was no wonder that in 1963 on the B-space side of the equation VISIT and CONGO were replaced by INDIP, which implied that economic aid now became a manipulative instrument, together with INDIP for the protracted struggle.

The equation for 1963 was

$$65 \text{ ECAID} + 64 \text{ INDIP} + 36 \text{ FDIPL} + 63 \text{ URAID} - 39 \text{ FCONF} \\ - 37 \text{ WELFA} + 37 \text{ DIVER} - 34 \text{ WESTC} \quad (r = .45) \quad (39)$$

But this equation was again statistically non-significant ( $Z = .01$ ). Then, why such a salient pattern in 1955 ( $r = .87$ ) turned into such a weak ( $r = .45$ ) and non-significant pattern? One possible

TABLE 20  
CANONICAL STRUCTURE EQUATIONS  
FOR CHINA'S PREFERENCE POLICY (EMAP)<sup>a</sup>

F A C T O R S	BEHAVIOR FACTORS										ATTRIBUTE DISTANCES										R <sup>2</sup>
	F	D	A	P	E	I	E	H	C	V	P	O	P	O	D	V	E	C	C	C	
1	30 <sup>b</sup>	-63	-31	.57							52	36	-43				33			-56	.57 <sup>00</sup>
2		74	56	30							-34	49	-49							-46	.96 <sup>00</sup>
3	33	65		39							33	31	-42	34						59	.30 <sup>00</sup>
NT		75	-62									-54								-36	.57 <sup>00c</sup>
1	36	64	65							34	-63			-37	-37					-39	.15
2	45	-60	57								-43			25			36			-36	.55 <sup>b</sup>
3		54	-65	-47						-39			-43	31	-57						.31
NT	-35	55	-65							32		-30	-36	34	-30					32	.61

<sup>a</sup>For computation, Charles Wall's CANONICAL program was used.  
<sup>b</sup>These are factor label codes.  
<sup>c</sup>Canonical correlations. <sup>\*\*</sup>Significant at the .005 level. <sup>\*</sup>Significant at the .05 level. Others not significant at .25 level.  
<sup>d</sup>0 = Original data (31 dyads). T = Transformed data (81 dyads). R = Reduced data (55 dyads).  
<sup>e</sup>Only loadings that exceed .30 are given in the table. Signs are as appeared in the original computer outputs. Decimal points are removed.

speculation is that it is because, in 1963, China's targets included many new African nations<sup>164</sup> and in this study most of these newly independent nations were omitted from the analysis. The disappearance of ORIENT, AGRIC and CTAB as high loading factors from the right hand side of equation 39 partly supports this view that China dropped the criterion of "Asian neighbor" in choosing her policy target and broadened her strategic sphere into other underdeveloped areas in Africa and Latin America.

Although the penetration pattern of China discussed above is not prominent on a model, it supports the view of most of the China watchers on Mao's "social construction" scheme: from rural areas (Asia, Africa and Latin America) to the urban area (Western Europe and North America).<sup>165</sup>

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<sup>164</sup>In 1955-6, the recipient nations of Chinese economic aid were North Korea, North Vietnam, Outer Mongolia, Nepal, Cambodia, Indonesia, Albania, Hungary and United Arab Republic. The recipients in 1963-4 included North Korea, North Vietnam, Outer Mongolia, Burma, Nepal, Ceylon, Syria, Yemen, Hungary, Cuba, Guinea, Algeria, Ghana, Tanganyika, Mali, Congo, Kenya, and Somali (underlined are non-Asian nations). In 1955-6, thirty percent were non-Asian, while in 1963-4, sixty percent were non-Asian. Source: 匪情年報 (Fei-Ch'ing Nien pao), 1967.

<sup>165</sup>See footnote 161.

## 9.6 Summary

In the above five sections, we discussed four distinct and two suggestive behavioral patterns of China. The findings can be summarized as follows:

The four distinct behavioral patterns of China discovered in this study are:

1) The over-all intensity of Chinese interaction with a nation measured by summing her cooperation and conflict behavior with that nation is mainly determined by the power distance of the nation from China. The more powerful a nation, the more likely that she has intense interaction with China.

2) The amount of the net cooperation of China with a nation (remnant cooperation after subtraction of conflict) is mainly determined by the difference of the nation in political orientation from China. The more similar a nation's political orientation to China (more communist party members and more trade with communist nations), the more likely that she has high net cooperation with China.

3) The formal diplomacy of China, measured in terms of the duration of diplomatic relations established, is largely determined by the object nation's political orientation and cultural affinity to China. China's formal diplomacy was directed mainly to the members of the socialist camp.

4) The degree of Chinese cooperation with a nation in international organization is mainly determined by the nation's economic development, and partly by the nation's political orientation. The

more developed a nation, the more likely that she shares membership with China in some international organizations.

The two suggestive patterns found in the study are as follows:

1) The informal diplomacy of China, measured in terms of the strength of China's interaction with non-ruling parties in the object nation, is found to be clearly oriented to world rural areas--non-communist, agricultural Afro-Asian nations.

2) The target of Chinese political penetration, measured in terms of the amount of economic aid and official visits, was revealed to be her unstable, developing Asian neighbors who were under American influence and where the Soviets had little interest.

Relations of the findings to current theories in international relations are:

1) The result strongly supports Kummel's status-field theory theorem that the joint behavior of cooperation and conflict are well explained by power distance and difference in economic development together.

2) The result partly supports the original status theory notion that conflict is more likely when there is a great power disparity between two nations. Partly, because this is true only if the disparity is positive (the object nation is more powerful).

3) The result supports the power transition theory (Organski) that when a new emerging power (China) challenges the old existing power, conflict is more likely.

## CHAPTER X

## RESULTS OF APPLICABILITY TESTS

As discussed in 4.5, to test the applicability for a practitioner of the empirically derived prediction models for China's foreign behavior, the 1963 behavior scores were forecast with the MRM and the CRM, respectively. The forecast scores, then, were compared with the actual observed scores.

The underlying logic is that, if field theory is valid, and, therefore, China's perceptual (P) and behavioral (Q) frameworks are the same across time, the structural equations that explain China's foreign behavior systems, which is generated from the data at one time point, should be applicable at any other time point. In short, the models, once generated, should be applicable under any circumstances.<sup>166</sup>

The tests were performed with 1955 and 1963 data using the 1955 model to predict the 1963 behavior scores: First, from the analysis of the 1955 data, the P and Q (in the MRM, P only) in equation (18) (10 for the MRM) were calculated. Then, applying P and Q of the 1955 models to the 1963 attribute distances, the 1963 behavior scores were forecast ( $\hat{W}$ ). The forecast score of each behavioral factor were correlated with the corresponding observed score.

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<sup>166</sup>This implies that a nation's foreign behavior decision making system is invariable across time. Attribute distances and actual behavior may change. But the pattern relationship between them should be unchanged.

As discussed in Chapter IV, the test was carried out three times: 1) forecasting the factor scores of behavioral factor dimensions with MRM, 2) the same forecasting with CRM, and 3) forecasting the behavioral pattern scores (canonical variate scores) with CRM. The results are given in Table 21, 22, and 23, respectively.

#### 10.1 Forecasting Behavioral Scores with MRM.

Out of the seven forecast behavioral scores of 1963 with MRM, three were fairly good. The correlations between the forecast and observed scores for FDIPL (foreign diplomacy), NECOM (negative communication) and CONGO (co-membership in international non-governmental organization) were .70, .69, and .70, respectively. This means that for these three, we could forecast about half of the variances of the 1963 behavior with the MRM model. The next good forecast was for TRADE (trade). The correlation was .55 which meant that thirty percent of the variance in the 1963 trade behavior could be forecast by the model. For the remaining three behaviors, however, the correlations were low: .32 for INDIP (informal diplomacy), .26 for ECAID (economic aid) and .05 for VISIT (official political visit). The mean of the squared sum of the seven correlations was .28 (trace  $r = .53$ ), which meant that approximately one-third of the total variance of the seven behaviors could be predicted with the model.

The forecast results were encouraging in that with few exceptions, the off-diagonal correlations in the table were very low. That most off-diagonal correlations were near zero strongly indicates that the decision framework of Chinese policy makers was fairly invariant

TABLE 21  
 TEST RESULTS OF FORECASTING 1963 BEHAVIOR FACTOR SCORES  
 WITH MULTIPLE REGRESSION MODEL<sup>a</sup>

			OBSERVED									
			1	2	3	4	5	6	7			
			T R A D E	F D I P L	I N D I P	E C A I D	N E C O M	C O N G O	V I S I T			
F O R E C A S T	1	TRADE	.55									
	2	FDIPL		.70								
	3	INDIP			.32							
	4	ECAID				.26						.31
	5	NECOM					.69					
	6	CONGO						.70				.30
	7	VISIT										.05

Mean of the squared main diagonal elements = .28 (trace r = .53)

<sup>a</sup>Figures in the table are product-moment correlations. Only the correlations that exceed .30 are given (on main diagonal, all are given).

TABLE 29  
 TEST RESULTS OF FORECASTING 1963 BEHAVIOR FACTOR SCORES  
 WITH CANONICAL REGRESSION MODEL.<sup>a</sup>

			OBSERVED									
			1	2	3	4	5	6	7			
			T R A D E	F D I P L	I N D I P	E C A I D	N E C O M	C O N G O	V I S I T			
F O R E C A S T	1	TRADE	.44									
	2	FDIPL		.69								
	3	INDIP			.32							
	4	ECAID				.08	.35					
	5	NECOM					.65					
	6	CONGO						.65				
	7	VISIT								.65		.03
Mean of the squared main diagonal elements = .23 (trace r = .49)												

<sup>a</sup>Figures in the table are product-moment correlations. Only the correlations that exceed .30 are given (on main diagonal, all are given).

TABLE 23  
 TEST RESULTS OF FORECASTING 1963 BEHAVIOR PATTERN SCORES  
 WITH CANONICAL REGRESSION MODEL<sup>a</sup>

ACTUAL <sup>c</sup> BEHAVIOR PATTERN		r <sup>d</sup>	FORECAST <sup>b</sup> BEHAVIORAL PATTERN							
			I	II	III	IV	V	VI	VII	
I	INTERACTION	.97*	.85							
II	COLDWAR	.92*		.33					.34	
III	INT'L ORG	.86*		.32	.52				.44	
IV	FORMAL DIPL	.85*		.38		.51				
V	PENET (ECAID)	.44					.33			
VI	INFORMAL DIPL	.40							.07	
VII	PENET (VISIT)	.20								.12

Mean of the squared main diagonal elements = .21 (trace r = .46).

<sup>a</sup>Figures in the table are product-moment correlations. Only  $r \geq .30$  are given (on main diagonal, all are given).

<sup>b</sup>Forecast canonical variate scores  $\hat{W}$ .

$\hat{W}$  is calculated from the following equation.

$$\hat{W} = D_{63} P_{55}$$

where  $D_{63}$  is the attribute distance matrix of 1963.

$P_{55}$  is the canonical regression weights of D distance matrix from 1955 data analysis.

<sup>c</sup>Canonical variate of 1963 behavioral factors.

<sup>d</sup>Corresponding canonical correlation in 1963 study. Asterisk (\*) shows that the r is significant at .05 level.

across time (from 1955 and 1963), because it tells us that similar weightings (P) were applied to the attribute distances (D) in both 1955 and 1963 to decide each behavior (W).

### 10.2 Forecasting Behavioral Scores with CRM.

As discussed in Chapter IV (4.5), the forecast results with CRM must be the same as those with MRM. Tables 21 and 22 confirm our expectation. Both tables look quite similar with the same high correlations (about .70) for FDIPL, NECOM, and CONGO, and the same medium correlation for TRADE in both tables.

But, in a one by one comparison of the correlations in the two tables, we can find that the correlations with CRM are slightly lower than those with MRM. This is because there were more computational errors in the CRM results.<sup>167</sup>

The forecast scores of the three good predicted behaviors are plotted against each corresponding observed score in Figures 12, 13, and 14, respectively.<sup>168</sup>

### 10.3 Forecasting Behavioral Pattern Scores with CRM.

The behavioral pattern scores are the weighted sum of the behavioral scores in the pattern [see Chapter IV, 4.5 (2)]. For example, the interaction pattern discussed in 9.1 was (.88 TRADE +

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<sup>167</sup>The  $\hat{W}_{63}$  for MRM was calculated with the equation  $\hat{W}_{63} = D_{63}P_{55}$ , which is simpler than the one for CRM,  $\hat{W}_{63} = D_{63}P_{55}Q_{55}^{-1}$ .

<sup>168</sup>Since the results of the MRM and the CRM were very similar, only those of the CRM were plotted.

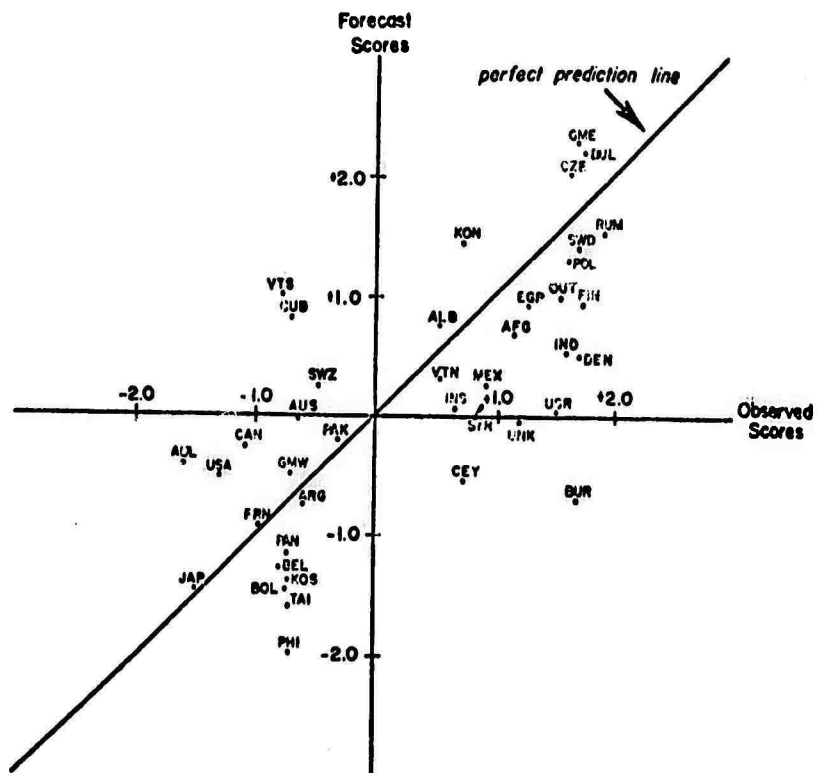


FIGURE 12  
CHINA'S FORMAL DIPLOMACY SCORES:  
FORECAST VS. OBSERVED

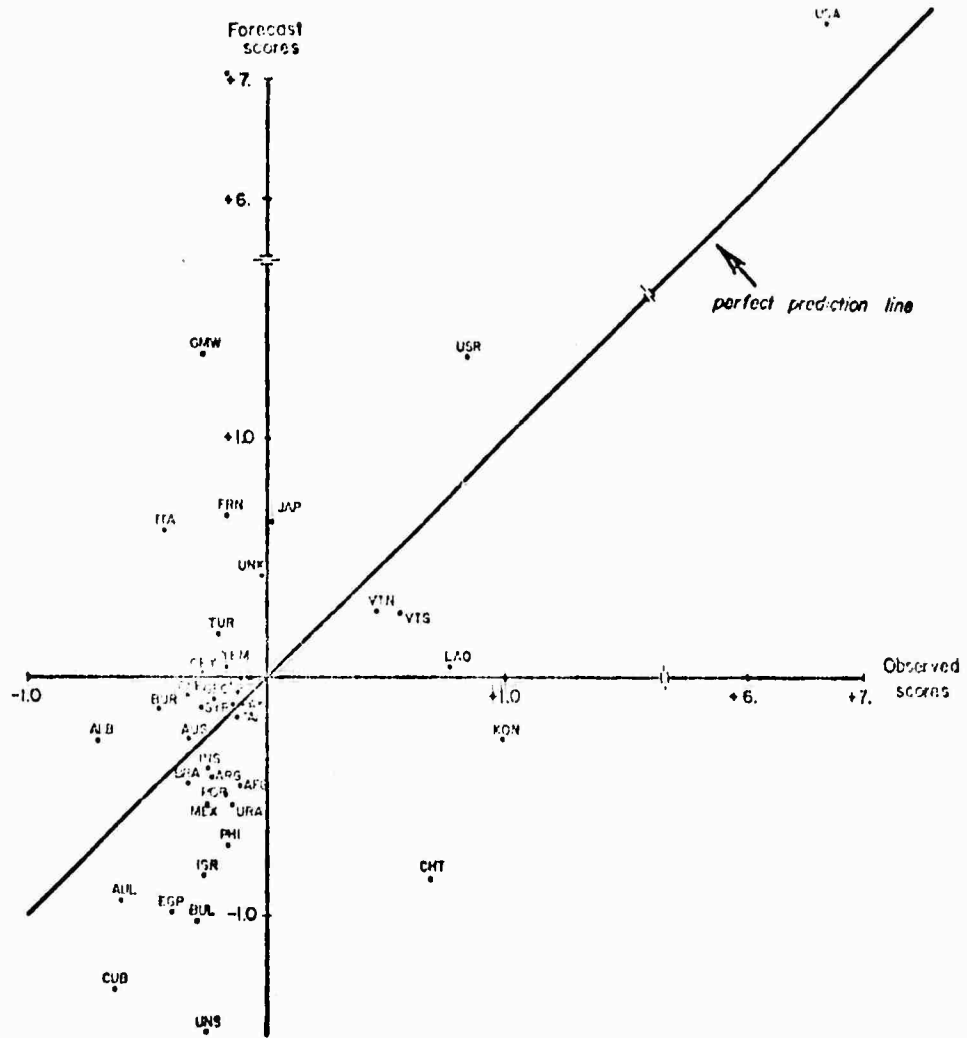


FIGURE 13  
CHINA'S NEGATIVE COMMUNICATION SCORES:  
FORECAST VS. OBSERVED

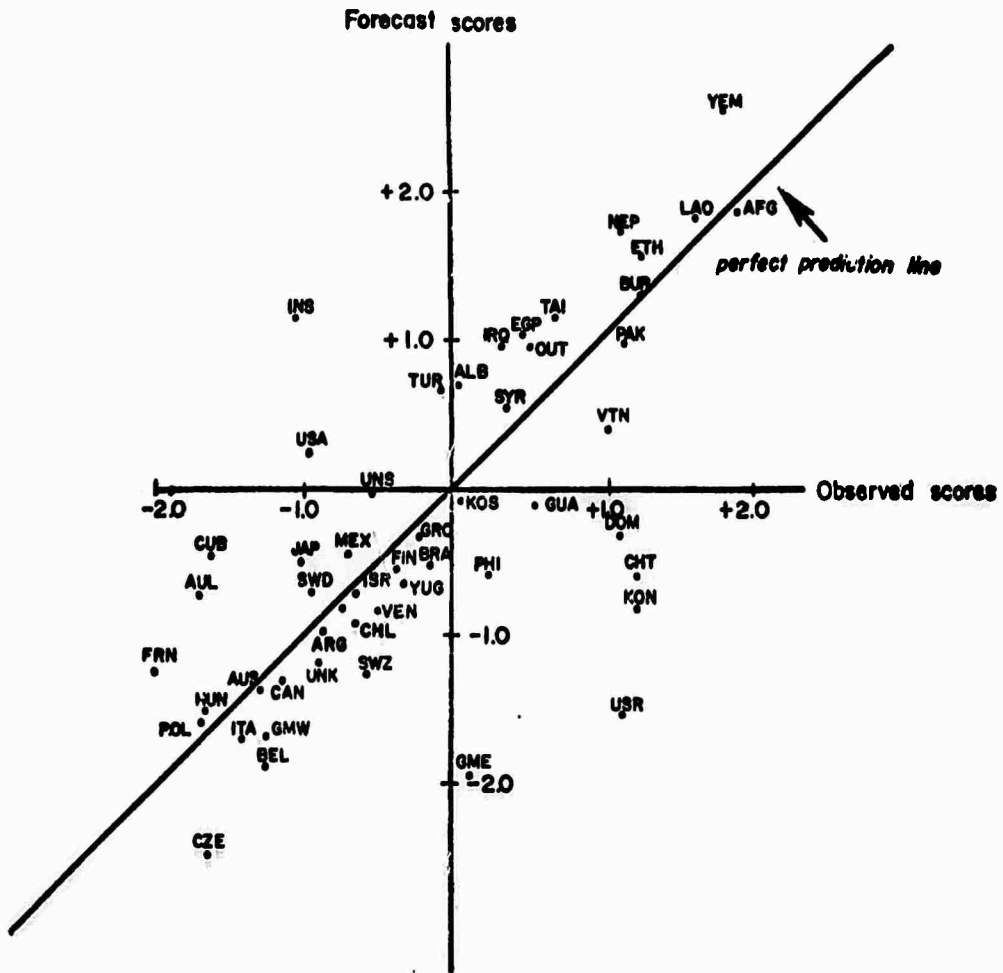


FIGURE 14  
CHINA'S NGO CO-MEMBERSHIP SCORES:  
FORECAST VS. OBSERVED

.46 NECOM) which was explained by POWER. The pattern score of a dyad for this behavioral pattern is, then,

$$.88 \times (\text{factor score of the dyad on the TRADE dimension,} + \\ .46 \times (\text{factor scores on the NECOM dimension}).$$

In other words, the pattern score is the score of the canonical variate calculated from the canonical regression analysis.

As mentioned before (Chapter IV), the behavioral pattern scores for all dyads in 1963 were forecast from the 1963 distances with the 1955 weightings (P = perceptual framework). Then, these forecast pattern scores ( $\hat{W}_{63}$ ) were correlated with the observed pattern scores ( $W_{63}$ ). The results were presented in Table 23.

Out of seven forecast pattern scores, the one for the first pattern--power-interaction pattern (TRADE + NECOM)--was strikingly good. The correlation for the pattern was .85 which means that more than seventy-two percent of the pattern variance was correctly forecast by the model. The result strongly supports that, at least, for China's interaction behavior, her foreign policy makers have invariant decision patterns: whenever they perceived the distances, they gave similar weightings to the attribute distances over time, and they applied a similar behavioral preference pattern in both years. The findings assure us that if we can tolerate about thirty percent error on the average we may apply this model to forecast future Chinese interactions from the power parity between China and the object nations.

The next good forecasts were for the international organization behavior pattern ( $r = .52$ ) and the formal diplomacy pattern ( $r = .51$ ). The accuracy of the forecasting for these two behavioral patterns was, in terms of the variance, about twenty-five percent. Although the accuracy is good enough to support the stable decision patterns, I think, the pattern is not stable enough to forecast actual intensity of the behaviors for practical use.

The forecast for the cold war behavioral pattern of China was not so good ( $r = .33$ ). As we discussed in 9.2, the pattern was salient (canonical  $r = .92$ , significant at .05) in both 1955 and 1963. Thus, we could expect higher correlations in forecasting. This unexpected result may be attributable to Chinese shift from the traditional cold war led by the Soviet Union against Western Powers to a new cold war of her own, challenging both the Western Powers and the Soviet Union.

The results of forecasting for the remaining three behavioral patterns were not so good ( $r$  was .33, .07, and .12). This was because all three patterns were statistically not significant (see Chapter IX, introductory).

Figure 15 plots the forecast pattern scores of Chinese interaction with all object nations in 1963 against the actual scores.

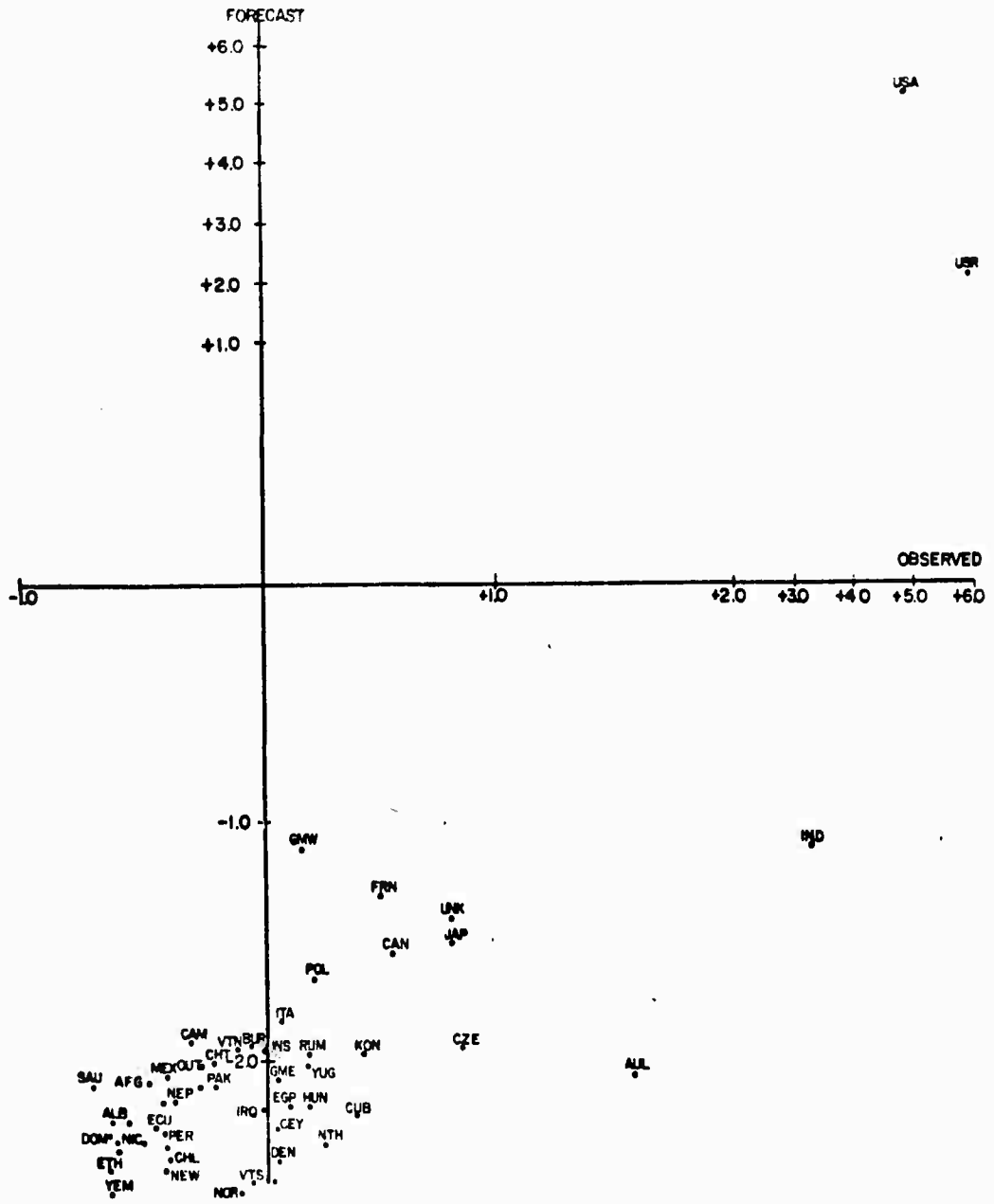


FIGURE 15  
CHINA'S INTERACTION PATTERN  
FORECAST VS. OBSERVED  
(pattern scores)

## CHAPTER XI

## CONCLUSION

The study as a whole was quite successful. The only results that did not meet my expectations were the forecasts with the developed models. For several behaviors the forecasts were fairly good, but for some others, unsatisfactory. Nevertheless, the results as a whole were very encouraging.

First, despite the limitations on selecting variables and with possible errors in the data, Rummel's field theory Model II was found to be applicable to a one-actor dyadic behavior study. The proposed linear linkage between attribute distances and dyadic behaviors was found to exist, and a direct application of the model to empirical data was proven to be useful for delineating pattern relationships among behavior factors and attribute distance factors.

Second, as a whole, more than half of the total variance in China's behavior could be explained by the delineated linear patterns. Out of the seven patterns on China's behavior and attribute distance linkages, attempted to be formulated through the analysis, four empirically applicable patterns could be successfully delineated. These were: the Chinese interaction pattern, comprising of conflict and cooperation behavior and explained by power distances; the Chinese cold war pattern, measuring Chinese net cooperation with a nation, explained by her political orientation; the Chinese formal diplomacy pattern

which is linked to the object nation's political orientation and her cultural and geographical affinity to China; and Chinese cooperation with a nation in international organization, which is explained by her economic development. All of these four patterns were statistically significant and the predicting powers of these pattern models ranged from ninety-nine percent to fifty percent of the variance in behavior variables, which means that with these models, China's behavior can be practically explained and predicted.

Third, the stability of patterns across time was within the satisfactory range, considering the problems involved in data handling. This means that the pattern models can be utilized to understand the future behavioral pattern of China.

Although most of the empirical findings of China's behavior from the application of field theory only reconfirm our general knowledge about her behavior and no new significant pattern was delineated at this point, the findings as a whole have significant implications for the study of a nation's foreign behavior in general as well as China's foreign behavior particularly.

First of all, the study results clearly show us that we can approach the study of foreign behavior of a nation with a general theory. Traditionally, it has been believed by many that a nation's foreign behavior is idiosyncratic to that nation, and, therefore, it is dangerous or impossible to study a nation's particular foreign behavior with a general theory, because there are so many factors that compose a special context within which a foreign policy is formulated.

But this study showed that China as a nation also follows a certain general rule: her foreign behavior is a linear function of her similarity to and differences from the object nations on various attributes. This means that there is a law that underlies every nation's foreign behavior. As we have seen, the apparently unique behavior of China can be explained by a general law.

Secondly, the results showed us that a nation's unique foreign behavior decision making system can be studied from the "outputs" of the decisions. In the past, it was believed that we needed to examine the contextual background of the decision situation in order to define the unique decision making system of a nation. The personal history of key decision makers, the general belief system of the society, the historical legacy of the decision making apparatus, societal environmental factors that may affect the decision makers' perceptual bias, etc., were studied to uncover the foreign behavior decision making system.

In this study, however, all these factors were theorized to be contained in the decision makers' perceptual and behavioral framework. Then, by studying the resulting behavior, and without a detailed study of each factor, the unique perceptual and behavioral framework of the decision makers were defined, and it was found that the discovered framework by this way was reliable. Considering the difficulty of studying each individual factor which may affect the decision makers' perception and behavior, this way of defining the decision making system is very important. The results of this study showed this possibility very clearly.

Finally, the succinct pattern relationship between Chinese foreign behavior and her attribute similarity and difference with others, discovered from this study, provides us with a nice theoretical framework with which we can estimate possible Chinese behavioral response to the hypothesized attribute differences. For example, if we suppose that China reaches the same power level as the U.S.A. in 1980 with other differences remaining the same, what would Chinese interaction with the U.S.A. look like? The models developed in this study will give the answer. The application of the models to this kind of simulation will contribute much for policy practitioners.

After all, the study reinforced my conviction that international relations can be fruitfully studied with a theory, and that this is the only way to obtain generalizable knowledge of a nation's foreign behavior.

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APPENDIX I-A  
ORIGINAL DATA FOR NATION'S ATTRIBUTE  
1955 AND 1963

1) UNIT, SOURCE AND FOOTNOTES FOR THE DATA

Common Footnotes

- R: my estimation based on my own knowledge  
D: DON (The Dimensionality of Nations Project) estimation  
M: computer estimation (with MISDAT Program)  
MA: my estimation based on M, above.  
S...: substitution by the data of the year .. e.g. S56 means that the figure is of 1956.

NO.	VARIABLE NAME	CODE	UNIT	SOURCE AND FOOTNOTES
1	population	POPUL	x 10 <sup>4</sup> persons	<u>United Nations Yearbook</u>
2	area	AREAT	x 10 <sup>3</sup> km <sup>2</sup>	<u>United Nations Yearbook</u>
3	density	DENST	persons in 1 km <sup>2</sup>	POPUL/AREAT
4	arable land	ARLND	%	<u>United Nations Yearbook</u> . Footnote for '63: N = estimation by North (North, 1969).
5	energy production	ENPRO	x 10 <sup>5</sup> metric tons	UN World Energy Supplies, 1960 for '55 and 1967 for '63. Footnote for '55: R estimates were based on Eckstein (1966) and Doolin and North (1967).
6	steel production	STPRO	x 10 <sup>3</sup> ton	<u>United Nations Yearbook</u> , footnotes for '55 and '63: E = Eckstein (1966).
7	gross national product	GNPTL	x 10 <sup>2</sup> million US\$	DON data, footnote for '55: Eckstein estimated 375 for CHN.

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APPENDIX I-A  
(CONTINUED)  
ORIGINAL DATA FOR NATION'S ATTRIBUTE  
1955 AND 1963

NO.	VARIABLE NAME	CODE	UNIT	SOURCE AND FOOTNOTES
8	literacy rate	LITRC	%	DON data
9	energy consumption per capita	EMCON	kg	same as ENPRO
10	telephone per capita	TELPH	x 10 <sup>-5</sup>	<u>UN Statistical Yearbook</u> , footnote for '55: S = S63.
11	population per physician	PHYSI	x 10	<u>UN Statistical Yearbook</u> , footnote for '55: S = S63.
12	GMP per capita	GNPPC	US\$	GMPTL/POPUL
13	non-agricultural population	NAGPO	%	<u>UN Statistical Yearbook</u> , footnote for '55: S = S63.
14	geographical distance from China	GEODS	cm	distance between capitals on 30 cm. globe
15	size of armed forces	FORCE	x 10 <sup>3</sup> persons	Coward, H. R. <u>Military Technology in Developing Countries</u> . Cambridge, Mass., 1967. Sellers, R. C. <u>The Reference Handbook of the Armed Forces of the World, II., 1967</u> . Footnote for '55: main source was Coward's. SL = Sellers. Footnote for '63: main source was DON. SL = Sellers, C = Coward.

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APPENDIX I-A  
(CONTINUED)

ORIGINAL DATA FOR NATION'S ATTRIBUTE  
1955 AND 1963

NO.	VARIABLE NAME	CODE	UNIT	SOURCE AND FOOTNOTES
16	number of combat airplanes	COMPL	number	main source: Sellers (1967). Footnote for '55: A = <u>Asahi Nenkan</u> , 1956.
17	defense expenditure	DEFEX	million US\$	main sources: Coward (1967) for '55, and DON data for '63. Footnotes for both years: SL = Sellers.
18	bloc membership	BLOCM	0: Comm. 1: Neut. 2: West.	Don Data.
19	Communist Party membership	COMST	ratio to POPUL x 10 <sup>-5</sup>	DON data.
20	killed in domestic violence	KILLD	number	DON data.
21	killed in foreign violence	KILLF	number	DON data.
22	US aid	USAID	x 10 <sup>5</sup> US\$	DON data.
23	USSR aid	URAIID	x 10 <sup>5</sup> US\$	Goldman, Marshall I. <u>Soviet Foreign Aid</u> . New York: Praeger, 1967. For Communist countries, p. 28, Table II-2, for other countries, pp. 204-5, Appendix I.

APPENDIX I-A  
(CONTINUED)

ORIGINAL DATA FOR NATION'S ATTRIBUTE  
1955 AND 1963

NO.	VARIABLE NAME	CODE	UNIT	SOURCE AND FOOTNOTES
24	UN voting	UNVOT	0: yes 1: abstention & absence 2: no	<u>UN Official Records of the General Assembly, Plenary Meetings.</u> Footnotes for both years: R = the score if the nation had voted.
25	colonialism	COLON	0: colonized 1: no 2: possessed	<u>Worldmark Encyclopedia</u>
26	Roman Catholic	CATHL	%	DON data. Footnotes for both years: W = <u>Worldmark Encyclopedia.</u>
27	Protestant	PROTS	%	DON data. Footnotes for both years: W = <u>Worldmark Encyclopedia.</u>
28	Moslem	MOSLM	%	DON Data. Footnotes for both years: W = <u>Worldmark Encyclopedia.</u>
29	Buddhist	BUDDH	%	DON data. Footnote for both years: W = <u>Worldmark Encyclopedia.</u>
30	language	LANGN	number	DON data. Footnote for both years: W = <u>Worldmark Encyclopedia.</u>
31	Chinese population	CHINS	code (see def. in main text)	<u>UN Demographic Yearbook.</u>

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APPENDIX I-A  
(CONTINUED)

ORIGINAL DATA FOR NATION'S ATTRIBUTE  
1955 AND 1963

NO.	VARIABLE NAME	CODE	UNIT	SOURCE AND FOOTNOTES
32	freedom of group opposition	GOPPO	index	DON data.
33	trade with West. bloc	WTRAD	million US\$	main source: DON data for '55 and IMF & IBRD. <u>Direction of Trade;</u> <u>Annual 1961-65 for '63.</u>
34	trade with Comm. bloc	CTRAD	million US\$	main source: DON data for '55 and IMF & IBRD. <u>Direction of Trade,</u> Pryor (1963), Eckstein (1966) for '63.
35	trade direction index	ITRAD	$\times 10^{-3}$	WTRAD/WTRAD + CTRAD

APPENDIX I-A (cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
NATIONS	AREAT	DEAST	ARELU	EXPRO	STRO	GHFT	LITIC	ENOM	TELEP	RESI	EXPPC	INPRO	GEOS
AFG001 1600	657	13	14	0	0	7	3	5	53	7000	53	125	100
ALB001 184	29	48	12	3	0	1MA	73	156	100	627	40	135	145
AND001 1912	2777	7	7R	73	29	72	87	582	5900	178	177	40	455
ANG001 900	7895	1	3	233	224	109	53	3625	17250	104	1155	84	270
AUS001 937	84	83	210	103	182	37	93	1851	7273	53	531	73	180
BEL001 147	31	291	32	300	585	93	97	4084	9970	55	1500	52	150
BEN001 374	1869	3	3	5	OR	2	31	145	560	350	72	35	123
BHU001 970	8512	7	2	40	115	53	49	280	1380	30	31	30	421
BOL001 750	111	68	39	55	7	22	95	788	100	700	235	45	176
BUR001 1265	873	29	12	3	OR	19	42	33	50	51	51	20	75
CAE001 110	191	25	11	0	0	23M	13	20	50	5000	70MA	30	91
CAN001 1870	5375	2	4	501	411	260	94	279	26420	85	1655	74	252
CEV001 472	65	131	23	0	OR	11	64	87	320	590	129	475	125
CHI001 370	742	9	7	30	29	12	73	798	2210	150	177	62	405
CHL001 510	8761	62	10R	950R	285E	350R	44	157R	470	370	55	15	0
CHN001 1265	35	248	24	26	4	16	44	383	470	153	181	50	43
CIS001 95	1139	11	4	94	8	42	56	415	1290	220	332	45	362
CUB001 513	51	53	17	1	3	3	70	214	1220	220	315	45	335
CZE001 1502	128	122	42	472	47	71	93	3850	5571	174	625	75	175
DEU001 353	491	152	14	6	OR	5	43	2495	20190	51	928	36	173
DEN001 369	271	14	4	6	OR	7	56	134	340	370	139	54	325
DOR001 355	1800	23	3	24	10	31	25	343	660	350	189	40	181
DRC001 113	21	104	270	0	OR	42	42	104	481	511	728	30	255
EGY001 120	1124	17	100	0	OR	9	3	5	30	21000	49	13	200
FIN001 426	337	13	8	9	1R	40	84	1184	10890	180	433	60	151
FRA001 423	547	79	29	613	1259	452	97	2160	7200	110	1084	75	157
GBR001 156	108	156	49	630	251	39	98	3878	6430	200	205	70	175
GHA001 5017	248	202	35	1661	2450	381	98	3257	7940	74	729	18	187
GRC001 707	132	80	27	4	OR	20	76	341	1530	52	251	48	152
GUI001 325	109	30	14	0	OR	6	30	121	242	500	189	38	320
HUN001 150	112	119	13	0	OR	3	11	30	130	1000	81	10	323
IDN001 374	45	166	52	173	163	38	99	1504	1865	60	100	24	324
IND001 1303	1046	129	48	399	173	274	14	114	1265	40	100MA	30	173
ITA001 1170	1472	55	12	188	OR	105	9	116	90	7100	100	42	130
JPN001 1513	8048	11	10	215	OR	21	13	154	320	240	115	20	134
KOR001 415	449	14	12	439	OR	10	13	259	610	500	154	25	190
LAT001 262	70	42	18	3	OR	15	98	1289	3800	177	519	51	190
LES001 175	21	93	17	0	OR	9	93	1124	3790	40	515	32	172
LUX001 600	301	159	52	104	540	212	77	740	4550	80	441	59	164
MEX001 300	370	241	14	495	S+1	213	97	721	3510	100	238	68	51
MOR001 100	60	15	9	0	OR	1	17	114	730	87	70	20	170
MUS001 100	121	79	10	28R	14	10MA	32	300R	6285	67	100MA	50R	20
NLD001 150	84	220	21	14	1	10MA	52	178	700	870	46	37	25
NOR001 159	237	7	7	0	OR	1MA	30	7	2300S	2300S	89MA	45	67
PER001 107	110	147	28	0	OR	4	47	475	2300	120	273	435	167
POL001 123	111	11	17	0	OR	2	8	22	2915	3000	160	195	300
ROU001 111	1760	1	2	0	OR	1	8	144	630	1020	90	205	208

APPENDIX I-1 (cont'd)

STATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	FOUR	AREAT	DENST	AMAND	ENPRC	STPRD	GNPPL	LITRC	ENCKW	TELEH	PHYSI	GNPPC	MAJPO	GRDGS
W5001	3002	1573	15	1C	213	51	55	40	642	1100	240	100	65	300
N2002	3002	141	61	20	0	GR	4	3	4R	205	80000	47	5	75
N1003	3005	34	20	25	135	98	76	33	2376	13360	100	707	80	104
N1004	210	265	8	2	20	10MA	27	38	1376	25000	72	1244	81	255
N1005	125	100	0	6	0	CR	3	37	101	100	260	241	30	326
N1006	200	324	11	3	31	17	33	93	2331	17150	52	902	81	167
N1007	30	1535	1	1R	4R	CR	2MA	57	601M	780	200M	25	24	200
N1008	300	1947	57	26	8	1	46	14	32	60	1300	45	20R	84
N1009	01	75	12	6	0	OR	3	72	335	2150	320	55	51	105
N1010	157	457	4	1	0	OR	2	68	40	360	220	108	44	600
N1011	040	1205	8	1	34	5	13	42	276	440	450	189	34	104
N1012	210	300	76	21	2	OR	44	62	120	230	1200	139	31	99
N1013	270	313	88	52	972	443	145	75	2321	1510	170	468	53	155
N1014	277	92	55	45	7	OMA	16	58	1297	2630	140	205	58	200
N1015	173	239	74	42	253	77	54	77	1038	940	85	312	20R	100
N1016	00	2253	3	0	618	OR	12	3	222	150	13005	209	15	150
N1017	00	505	58	40	145	122	74	76	606	2710	58	255	52	221
N1018	00	450	16	8	30	215	85	98	2144	3050	130	1170	76	161
N1019	00	121	23	11	19	17	61	93	1825	24400	70	1226	84	192
N1020	00	185	23	25	0	OR	4	27	191	900	400	104	40R	166
N1021	00	514	39	15	0	OR	21	54	50	50	460	103	34	80
N1022	00	781	31	22	42	10	65	35	224	600	340	270	28	163
N1023	00	1221	11	7	322	158	52	42	2387	630	200	372	73	281
N1024	00	2300	0	10	408	4527	1500	81	2340	3300	60	749	655	134
N1025	00	244	210	29	2356	2011	511	93	4533	13340	120	908	94	104
N1026	00	324	21	24	12009	10617	3873	97	7763	33000	75	2336	97	207
N1027	00	324	21	24	12009	10617	3873	97	7763	33000	75	2336	97	207
N1028	00	107	14	12	1	1	15	85	455	4370	113	573	51	442
N1029	00	510	5	3	1539	2	44	43	2123	1810	150	762	60	360
N1030	00	159	90	8	11M	11M	20MA	13	65R	100R	100	100	205	56
N1031	00	171	73	17	0	OR	16	72	37	100	6100	133	105	81
N1032	00	155	23	18R	0	0	5M	3	58E	205	156255	90R	255	178
N1033	1759	236	69	32	89	81	52	75	586	910	260	290	27	178

APPENDIX I-A (cont'd)

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
NATIONS	FORCE	COMPL	REFEX	BLDCH	COMST	KILLD	KILFP	USAID	URSID	UNWOT	COLON	CATHL	PROTS	MOSLM
AFGJCI	430	0	15D	1	0	0	0	20	10	1	C	0	0	95
ALBPC2	420	C	56563	0	3528	0	0	0	14	OR	0	0	0	73
ARGSC3	139	120	106	2	262	4370	0	62	C	2	1	10	2	0
AUSOC4	52	100	386	2	54	0	0	OR	0	2	2	23	65	0
AUSOC5	70	20	7D	1	1054	113M	24M	75	0	1R	0	90	6	0
BELCO9	1400	300A	3130	2	169	0	0	OR	0	2	2	95R	2	0
BOLCG7	12	C	2	2	93	4	0	317	0	2	1	95	3	0
BRACR	107	300A	369556	2	171	15	0	563	0	2	1	93	3	0
PULSC9	1940	200	254563	C	6068	268	83	1	139	OR	1	0	1	13
RUSJ10	3355	10	7D	1	42	0	0	380	0	OR	0	1	1	8
CAMP11	47557	0	37559	1	24	0	0	OR	C	OR	0	0	0	2
CANC12	121557	300	1710	2	48	0	0	OR	0	2	1	45	51	0
CEYD13	20	0	6556	2	27	10	0	1	0	OR	7	7	2	7
CMLC14	42	70	93	2	592	0	0	62	0	2	1	90	4	0
CHYD15	35530	200	30940	0	1759	2000	2385	0	1414	OR	1	1	0	2
CHYD16	530556	200A	165559	2	0	0	2385	1402	0	2	0	2	2	OR
CCLC17	170	20	650	2	40	566	0	45	0	2	1	100	0	0
COSD18	1	0	2	2	105	20	0	53	0	2	1	96R	1R	0
CUCD19	230	10	51557	2	490	555	0	5	0	2	1	91	5	0
CZE020	4400	300A	1090R	0	11374	4	0	OR	33	0	0	75	13	0
DEKZ21	60	100	10R	2	383	0	0	OR	0	0	2	57	0	0
ECW22	9	20	23	2	0	0	0	3	0	2	1	98	2	0
ECW23	23	10	17	2	136	1	0	43	0	2	1	94	0	0
EGW24	92	200	147	1	9	5	4875	663	0	1	1	1	1	87
ELS25	7	0	7	2	41	C	0	0	0	2	1	98	1	0
ETW26	200	0	27559	2	0	0	0	41	0	2	0	0	95	0
FIW27	390	20	10R	1	766	0	0	OR	0	1R	1	0	95	0
FRW28	7530	1000A	25300	2	867	0	4486	23	0	2	2	97	2	0
GFW29	1140	200	10635L	0	7145	0	0	0	0	OR	2	11	82	0
GWD30	1900	500	1090R	2	120	0	0	194	0	24	2	45	51	0
GRC031	1370	200	185K	2	251	0	0	585	0	2	1	0	0	2
GUP32	3556	0	7	2	31	20	0	102	0	2	1	97	3	0
HAI033	5	0	5	2	0	53	0	125	0	2	1	92	0	0
HAI034	4	0	3	2	30	38	35	14	0	2	1	98	2	0
HAI035	1730	90A	524R	0	8788	13391	13350	0	45	OR	1	69	27	0
IND036	3580	300	414	1	28	1672	16	1122	1	0	1	1	0	10
IND037	249556	0	346	1	667	4177	0	24	0	2	0	1	3	90
IND038	1310	75	49	1	33	127	0	1282	0	2	0	0	0	98
IRW039	600	20A	80556	2	42	55	0	29	0	2	1	4	0	94
IRW040	137	100	30R	1	3	0	0	OR	0	2R	0	94	5	0
ISL41	500	100	77	1	200	0	5228	53	0	1	1	1	0	7
ITA042	2680	400A	7330	2	3121	0	0	1032	0	2R	2	99	0	0
JAP043	197556	100	437	2	101	0	0	603	0	2R	0	0	0	0
JCR044	200	10	30596	2	365	0	263	89	0	2R	2	0	0	93
KC045	5360	300	20R	0	12362	0	0	C	17	OR	0	0	0	0
KCS046	450556	150A	120	2	0	0	0	3150	0	2R	0	1	4	0
LAO047	25556	0	11559	1	235	135M	82M	2364	0	OR	0	0	0	0
LEB048	50	20	8	1	546	23	0	77	0	2	0	49	0	50
LBR049	4589	0	1559	1	0	0	0	169	0	2	1	1	1	OR
LAV050	20	0	4559	2	27	247M	0MA	135	0	1R	0	3	0	96

APPENDIX I-4 (cont'd)

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	NATIONS	COUNT	DEFTX	RANGE	CONST	KILLD	KILLY	UNSLD	UNSLD	UNFOT	COLON	CATBL	PROTS	MOSEL
	PEM031	48	35	2	17	28	0	51	0	2	1	0	1	0
	MEM052	20	20	1	21	0	0	26	0	0	1	0	0	1M
	NTM053	300D	530R	2	233	0	0	OR	0	2	2	39	42	0
	MEM054	110	650	2	19	0	0	OR	0	2	2	14	74	0
	NIC055	4557	4559	2	40	0	35	36	0	2	1	96	4	0
	NGP056	330	1220	2	233	0	0	OR	0	0	1	0	99	0
	CLT057	235L	255L	0	3610	0	0	0	27	OR	1	0	0	OR
	PAK058	190556	172	2	2	3	20	1107	0	2	C	0	0	86
	PAN059	3558	1559	2	54	0	0	29	0	2	1	93	6	0
	PARG67	6	3557	2	128	10	0	07	0	2	1	96	2	0
	PER061	16	33	2	53	0	0	1099	0	2	1	99	1	0
	PHI062	42556	48	2	21	5	0	308	0	2	1	83	10	4
	PCL063	300D	2200	0	5278	140	0	MA	RR	0	1	98	1	0
	FCR064	730	610	2	34	0	0	396M	0	1R	2	97	0	0
	RU065	2500	90R	0	3437	0	0	0	178	OR	1	17	6	0
	SAU066	30	15358	1	0	0	0	3	0	1	1	0	0	95
	SPN067	5000	2100	2	17	0	0	1158	0	2R	2	99M	0M	0
	SMD068	740	710R	1	379	0	0	OR	0	0	1	2	94	0
	SZ069	50	1750	1	121	0	0	OR	0	1R	1	42	56	0
	SYR070	450	23	1	259	13	56	2FOM	0	1	1	3	0	4
	TAL071	450	41	2	25	0	0	485	0	2	1	0	0	0
	TU072	4230	166	2	0	0	0	1093	0	2	1	0	0	98
	UNSC73	300A	61	2	11	69	0	161M	0	2	2	5	37	1
	US074	43500	1000R	0	3604	50	13350	0	0	0	1	5	66	1
	UNK075	900	4762556	2	66	0	4509	350	0	2	2	9	90	0
	USA076	32140	40730	2	OR	0	0	0	0	2	2	22	33	0
	UR077	0	240	2	191	0	0	4	0	2	1	85	1R	0
	VEN078	17	103	2	173	22	0	2	0	2	1	95	1	0
	VIN079	210R	150R	0	3141	231M	327	0	0	OR	0	4	0	0
	VTS080	150556	17358	2	14	199M	245M	368M	0	2R	0	16	0	0
	YEM081	180	18RE	1	0	0	23	0MA	0	1	0	0	0	95
	YUG082	5560	5660	1	3457	103M	0	1434	0	0	1	32	1	12

APPENDIX I-A (cont'd)

	29	30	31	32	33	34	35
NATIONS	BUDEI	LAURE	CHINS	COFRG	WTRAD	CTRAD	ITRAD
AFG001	0	4	J	C	29	2M	852M
ALB002	0	2	0	0	1	0	900
ARG003	0	1	0	1	1240	218	850
AUL004	J	1	4	2	264R	63	977
AUS005	0	1	0	2	1115	194	852
BELO06	0	2	0	2	3847	192	952
BEL007	0	4	0	2	145	0	909
BRA008	0	2	0	2	1502	173	897
BUL009	0	3	0	0	33	30	917
BUR010	83	3	5	2	116	49	703
CAN011	90	4	6	2	4	23M	801M
CAN012	0	5	4	2	8006	23	997
CEY013	64	2	0	2	390	3	982
CHL014	0	1	0	2	562	5	992
CMR015	26	4	8	0	16R	7	961
CMT016	20R	3	7	1	130	0	999
COL017	0	1	0	0	1002	5	995
COS018	0	2	2	2	121	0	998
CUP019	0	1	4	1	879	43	993
CZE020	0	2	0	0	261	43	957
DEU021	0	1	0	2	1656	134	925
DDM022	0	2	2	1	178	1	997
EGY023	0	3R	0	2	135	C	998
EGY024	0	1	0	1	475	163	745
ELS025	0	1	0	2	147	0	997
ETH026	0	RR	0	0	72	1	999
FIN027	0	2	0	2	86R	403	683
FRN028	0	1	0	2	4011	320	926
GME029	0	1	0	0	161	44	744
GMB030	0	1	0	2	6377	576	988
GRC031	0	2	2	2	429	40	915
GUA032	0	2	0	1	192	0	995
HAJ033	0	2	0	2	67	1	947
HUN034	0	2P	2	1	79	0	955
HUN035	0	2	0	0	146	1R	911
IND036	0	11R	3	2	16R1	52	970
IND037	3	2	6	1	746	67	917
IND038	0	10M	0	0	452	31	927
IRQ039	0	3	0	0	529	10	931
IRE040	0	1	0	2	756	15	940
ISR041	0	1	0	2	300	30	909
ITA042	0	2	0	2	2384	243	908
JAP043	45	1	4	2	2287	141	942
JOR044	0	3P	0	2	17	13M	961M
KOR045	40R	1	4	0	3	97	31
KGS046	40R	1	4	2	172	1	987
LAI047	90R	5R	3	2	24563	0563	857M
LEN048	0	7R	0	2	141	11	929
LBR049	0	5	0	2	43	0MA	922M
LBY050	0	7	0	2	33	5M	938M

APPENDIX I-A (cont'd)

	29	30	31	32	33	34	35
	BTBCH	LAMBH	CHINS	COFPO	WTRAD	CTRAD	WTRAD
MEX041	0	2	3	2	1341	2	49R
NEP052	SOR	3	0	1	50R	OR	50CR
NTWC53	0	1	0	2	393R	221	946
NEWC54	0	2	3	2	126R	9	993
NIC055	0	3	0	2	102	0	999
ADR956	0	1	0	2	1124	106	914
CUT057	85	1R	0	0	OR	3M	OR
PAK058	0	6	0	2	355	9	976
PANG59	0	2	3	2	74	OR	100CR
PARC60	0	2	0	0	28	0	906
PER061	0	3	0	2	383	2	995
PHI062	0	0	5	2	721	0	949
POL063	0	2	0	1	370	63	854
PDR064	0	1	0	0	399	9	977
RUM065	0	3	0	0	190	34	749
SAU066	0	1	0	0	478	1	998
SPH067	0	3	0	0	571	13	977
SWD068	0	1	0	2	2807	206	932
SWZ069	0	4	0	2	1995	122	943
SVR070	0	4R	0	2	184	11	943
TAT071	94	2R	5	CS63	289	0	999
TUR072	0	3	0	2	504	196	720
UNSG73	0	11	3	2	1540	21	986
USEG74	1	11R	3	0	536	320	647
UNK075	0	1	3	2	9674	874	916
USA076	0	1	5	2	12518	304	976
URAC77	0	1	0	2	245	20	924
VEN078	0	1	0	2	1740	4	998
VIN079	SOR	3R	5	1	OMA	11M	750M
VTS080	SOR	3P	5	1	2C34A	OMA	9694
YEM081	0	1	0	0	OMA	OMA	8924
YUG082	0	7	0	0	475	70	872

APPENDIX I-4 (cont'd)

3) 1963 DATA	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MAYNDS	PCRL	AREAT	DEBST	ARLND	EMRPO	STPRD	CAPTL	LITRC	EMOY	TELEP	RHYSI	GNPFC	MIGRO	CECOS
AFGG21	1534	587	24	224	11	OR	11	3	20	54	32CC	80	10	177
ALR002	176	79	61	17	11	OR	4M	72	323	341	32C	206M	10	195
APG153	2169	2777	8	7	323	94	129	94	1137	6577	67	614	72	465
AUL004	1502	7455	1	4	103	464	181	98	4156	23373	89	1679	70	220
AUS005	717	44	86	20	103	295	75	94	2541	12078	55	1041	68	140
BELO06	929	31	304	29	215	753	140	96	4647	14632	72	1360	97	190
BELO07	360	1090	3	11M	6	OR	6	33	161	528	350	184	74	423
BELO08	7752	5512	9	11M	109	281	152	47	1960	1573	450	194	43	174
BUL009	939	111	71	61	123	46	49	97	48	2745	67	617	25	174
BUL010	2374	673	35	22	9	OR	17	57	48	88	560	72	20	172
CAN011	589	161	33	16	0	OR	8	17	47	59	2500	127	19	41
CAN012	1402	5974	2	4	1117	743	392	62	6556	35127	2500	2076	60	252
CEY013	1359	66	162	23	0	OR	15	62	114	397	460	142	47	125
CHL014	822	742	11	2M	68	49	39	87	1103	2859	160	483	72	465
CMR015	9030	9761M	72	1GN	2844	1200E	420R	47	418P	1300	1576M	62	22	3
CPT016	1177	35	325	25	51	22	20	58	573	1137	170	169	54	43
CFL017	1693	1138	13	4	154	21	47	52	534	2106	240	292	54	362
COS018	134	51	27	12	1	OR	5	91	251	1492	220	177	49	335
COR019	724	115	63	24M	0	20MA	28MA	77	908	3054	120	381M	59	305
CZE020	1505	129	109	42	740	760	115R	97	5631	9219	54	823	82	178
DE021	454	43	109	65	8	36	76	94	3714	24450	51	1620	75	173
DEM022	334	49	68	23M	0	OR	9	42	177	828	678R	269	30	325
ECU023	481	271	17	11	5	OR	9	81	176	915	260	199	30	373
EGP024	2757	1090	28	3	74	28MA	39	55	298	964	260	135	34	181
ELS025	272	21	127	24	0	CP	7	69	152	772	480	261	38	325
FIN026	2140	1184	18	8	0	OR	9	2	9	92	5600	47	10	200
FRA027	454	137	13	8	10	31	54	98	2070	16057	150	1195	78	151
FRA028	4785	547	57	29	688	1756	166	96	2533	11152	51	1601	52	197
GAB029	1009	108	149	46	789	361	344	98	5374	9416	2055	216	70	175
GAB030	5543	244	224	34	1894	3160	915	98	4128	13711	67	1452	92	147
GRC031	443	132	64	30	13	20MA	43	36	551	4158	79	607	53	182
GUA032	413	100	24	20	0	OR	12	27	171	478	450	183	25	320
HAI033	423	28	160	30	0	OR	4	12	30	94	1100	80	17	323
HAI034	214	112	18	7	0	OR	4	70	165	420	100R	206	33	324
HUN035	1003	63	108	60	202	2374	70	99	2484	5075	61	600	64	174
IND036	2344	3069	151	53	701	5971	400	53	168	146	530	24	28	31
IND037	2344	1402	67	15M	335	30MA	81	66	111	148	4100	80	70	130
IND038	2313	1643	14	10	967	20MA	48	51	153	729	340	216	40	134
IND039	778	449	15	26	746	OR	16	56	441	715	450	224	45	150
IND040	244	72	40	19	25	10MA	22	98	2232	6776	55	764	65	199
IND041	233	21	115	19	2	10MA	26	90	1455	7815	40	1111	97	172
ITA042	2864	351	168	51	194	1016	619	92	1564	5938	61	830	73	194
JAP043	9490	370	259	15	643	3150	592	97	1531	8730	60	617	75	51
JOR044	133	60	20	12	140	OR	4	65	260	1346	500	199	50	170
KOR045	1150	121	39	27R	0	122	64M	84	1221R	636	6785	314M	50	20
LAV046	2687	99	273	21	80	14	31	84	300	636	250	114	43	25
LAV047	251	217	8	4	0	OR	2	17	39	40	3800	147	5	68
LEB048	229	10	212	20	0	OR	8	47	611	4167	100	344	40	167
LBR049	103	111	9	27	0	OR	2	37	170	291	1600	170	19	300
LAV050	150	1760	1	1	287	OR	5	7	286	800	580	359	20	208

APPENDIX I-1 (cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
NATIONS	AREAT	DEIST	ARLND	EMPO	STPR	CAPTL	LYTRC	EMOM	TELEP	FINSI	GNPPG	FACRO	CECDS
MEK051 3167	1973	19	12	12	137	154	80	539	1653	180	402	46	303
NEP052 973	141	69	28	0	OR	6	3	5	29	7200	59	5	75
NI053 1197	34	356	29	152	234	139	98	3100	16000	89	1159	00	185
NE054 254	269	9	3	24	106M	44	98	2052	35512	65	1720	84	255
NI055 154	147	11	13	0	OR	5	69	243	909	280	301	40	226
NO056 307	324	53	3	53	54	56	98	3151	22834	63	1516	81	167
CU057 103	1535	11	3	8	10MA	3MA	98	744R	165	55	244M	29	28
PAC058 3863	947	134	27	33	1	88	52	79	139	1100	81	25	94
PAN059 117	76	16	8	0	OR	5	83	910	3333	250	483	52	345
PAP060 191	437	5	2	0	CR	4	87	102	691	170	193	25	430
PER061 1094	1285	9	1	55	7	28	92	562	1250	170	262	42	405
PHI062 3324	303	101	27	3	20MA	40	83	190	484	507R	134	56	68
PLO063 3059	313	98	21	1194	890	192	97	3431	3548	54	564	55	185
PR064 924	92	58	45	10	22	29	73	459	5365	120	322	58	230
RUC065 1341	238	79	44	405	270	117M	92	1801	2004	70	432M	27	168
SAU066 669	2253	3	0	1054	OR	11	5	279	409	1300	175	15	158
SPK067 3103	505	62	41	169	243	151	90	944	7257	82	497	62	221
SMD068 760	450	17	7	49	390	150	98	3575	40184	100	1977	86	161
SMZ069 577	41	140	10	27	32	112	98	2548	34627	75	1924	89	192
SVK070 503	145	28	48	0	OR	8	04	289	1360	520	167	44	166
TAI071 2384	514	56	20	1	14MA	31	32	84	191	1030	106	1R	80
TUS072 2359	781	39	23	62	33	72	62	299	957	370	238	35	183
UN073 1704	1221	14	10	425	283	93	57	2464	6279	200	545	56	281
US074 22478	22402	10	10	8071	8020	1876	99	3233	2853	50	878	65	138
US075 5380	244	221	20	2306	2288	829	98	5093	17224	56	1552	95	176
US076 13442	5363	20	20	15164	9912	5770	93	8508	44586	76	3043	92	267
US077 265	197	14	12	1	7MA	14	93	829	6377	67	478	85	460
VEN078 814	512	9	5	2287	30MA	60	83	2752	2561	140	728	69	349
VIN079 1783	159	112	8	34	20MA	23MA	80	193R	137	1100S	133M	25	56
VYS080 1532	171	50	18	1	10MA	17	90	61	137	2900	114	10	81
VEN081 500	195	26	15	0	0	5MA	2	7	20	15625	90	25	178
VUG082 1905	256	75	22	177	159	58	85	1025	1689	140	303	50	178

APPENDIX I-A (cont'd)

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	BATTLES	CONFL.	DEFTX	BLCK	CONST	KILLD	KILLY	DEAD	WRAID	UNROT	COLON	CATBL	PROTS	MOSES
AFG001	100	106	13	1	0	0	0	174	239	0	1	0	0	90M
ALP002	45	60	56	0	3011	0	0	0	0M	0	1	5	0	73M
ANG003	115	160	256	2	207	36	0	997	OR	2	1	99	0	0
AUS004	86	304	54	2	54	0	0	0	0	2	2	21	0	0
AUS005	24	20	488	1	488	0	0	0	0	1	1	89	0	0
BELO06	100	374	118	2	118	0	0	0	0	2	2	95	0	0
BELO07	100	374	442	2	165	A	0	356	OR	2	1	94	0	0
BELO08	100	374	6	2	165	A	0	865	OR	2	1	92	0	0
BELO09	190	84	314	2	40	0	0	0	787	0	1	1	0M	10M
BELO10	120	150R	254	0	6262	0	0	0	9	0	1	1	0	0
BUS011	165	48	102	1	21	1200	0	153	136M	0	0	1	0	2
CAN012	35	46	45	1	0	0	3	200	0	2	1	1	0	0
CAN013	126	424	1457	2	21	3	0	0	0	2	1	43	50R	7
CEVO14	95L	0	15	1	47	0	0	4	29	0	1	7	2	0
CHLO15	43	35	59	2	304	5	0	413	OR	2	1	90	0	0
CHLO16	2421	2250	5570	0	2647	200	157	0	146	2	1	1	0	2
CHLO17	542	395	218	2	0	0	157	386	0	2	1	07	2M	1M
CHLO18	32	10	110	2	65	0	0	935	OR	2	1	07	1M	0
CHLO19	1	0	2	2	0	0	0	130	OR	2	1	96	1R	0
CHLO20	65	136	220	0	387	500	0	0	575	0	1	84	1R	0
CHLO21	220	176	214	2	107	0	0	0	105	0	1	63	10R	0
CHLO22	19	28	47	2	0	30	0	296	0	2	1	95	2	0
CHLO23	19	28	42	2	42	8	0	182	OR	2	1	94	0	0
CHLO24	154	400	237	1	4	0	30	196	481	2	1	98	1	87
CHLO25	3	3	37	2	37	1	0	100	OR	0	1	98	1	0
CHLO26	43	28	22	1	0	100	0	100	OR	0	1	95	95	0
CHLO27	42	39	119	1	881	0	0	0	0	0	1	95	95	0
CHLO28	827	1027	3767	2	543	0	0	0	0	2	2	83	2	0
CHLO29	323	391	1245	0	10012	0	0	0	114	OR	1	11	12	0
CHLO30	414	1753	4340	2	90	0	0	0	0	2R	1	48	50R	0
CHLO31	145	325	154	2	236	0	0	316	OR	2	1	93	0	2
CHLO32	12	22	24	2	24	2	0	31	OR	2	1	93	0	2
CHLO33	5	6	7	2	OR	200	0	21	OR	2	1	93	0	0
CHLO34	45L	40	93	2	93	8	0	73	OR	0	1	97	0	0
CHLO35	81	165	824	0	5190	0	0	0	178	0	1	59	25R	0
CHLO36	596C	540	990	1	26	914	0	422	813	0	1	2	0	11
CHLO37	305	340	1200	1	1899	57	42	367	97	0	1	1	3	0R
CHLO38	150	204	726	2	9	584	0	234	0MA	2	1	0	0	08
CHLO39	170	102	139	1	218	1655	0	8	259	0	1	3	0	45
CHLO40	135L	10	30	1	0	0	0	0	0	2	1	0	5	0
CHLO41	250	257	182	1	94	0	7	450	0	1	1	2	1	0
CHLO42	787	600	1283	2	2666	9	0	0	0	2	1	100	0	0
CHLO43	245	572	599	2	118	44	4	427	0	2	1	3	0	94
CHLO44	50	7	51	1	0	0	0	0	137	OR	1	1	0	0
CHLO45	369	470	200	0	11304	0	2	1279	0	2R	1	2	5M	0
CHLO46	591	190	153	2	0	0	0	381	113M	0	1	2	0	0
CHLO47	110	65	17	1	0	1120	3	1	0	0	1	41	0	50R
CHLO48	10	22	25	1	179	0	0	399	OR	2	1	1	50R	06
CHLO49	6	0	0	1	0	0	0	113	OR	2	1	3	0	06
CHLO50	5	5	17	1	0	0	0	0	OR	2	1	3	0	06

APPENDIX I-1 (cont'd)

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	MATKNS FOUZE	COMPL	DEVEY	BLOCH	CHAST	KILLD	KILLF	USAID	URAIID OR	UNPROT	COLON	CATHL	PROTS	MESLM
PERCS1	62	23	101	2	130	3	0	39	80MA	0	1	94	1	0
AE952	33	0	41	2	100	50	0	0	0	0	2	0	0	1M
ATM033	124	287	641	2	100	0	0	0	0	1	2	40	42R	0
NE654	23	20	39	2	39	0	0	0	0	2	2	14	74R	0
NIC055	7	25	8	2	0	2	0	35	OR	2	1	94	4R	0
AC956	37	220	193	2	0	0	0	0	0	0	1	0	99	0
CUT057	205L	6	451	0	451	0	0	0	299	0	1	0	0	0
PAK058	253C	145	159	2	3	133	0	1861	43	0	1	0	0	88
PAR059	3	0	0	2	0	0	0	0	OR	2	1	72	0	0
PAR060	16	0	12	2	209	2	0	30	OR	2	1	93	2	0
PEP061	49	69	73	2	73	10	0	20	OR	2	1	96	1	0
PHI062	49	44	70	2	7	0	0	33	OR	2	1	96	1	0
PCL063	370	630	9175	2	4806	0	0	0	0	2	1	76	10	4
PCR064	108	156	150	0	22	0	0	0	301	0	1	97	1	0
RU4065	222	272	665	0	6592	0	0	0	355	0	2	92	0	0
SAJ066	32C	18	113	1	0	0	30	0	204A	1	1	10	6	0
SP067	405	350	363	1	16	0	0	0	0	2	2	100	0	95
SW7068	33	1050	713	1	263	0	0	0	0	0	1	1	95R	0
SW7069	703	344	365	1	104	0	0	0	0	1R	1	40	55R	0
SYG070	60	87	100	1	80	82	3	2	17	0	1	3	0	67
TAIC71	75	120	77	2	0MA	0	0	174	0	2	1	0	0	4
TUR072	400	725	284	2	3	28	0	1308	1	2	1	0	0	99
UM5073	25C	75	179	1	6	44	0	0	0	2	2	6	57	1
US074	350J	12300	15444	0	4894	212	2	0	0	0	1	4	86555	1
US075	623	1266	1369	2	63	0	0	0	0	0	2	8	99	1
US076	271R	8250	53429	2	OR	3	2	79	0	2	2	23	33	0
UAI077	3	7	17	2	377	0	0	0	OR	2	1	85	1R	0
VEN078	33	83	135	2	369	145	0	331	OR	2	1	93	1	0
VIV079	420	123	300	1	371	0	0	0	OR	0R	0	3	0	0
VIS080	400	126	267	2	130	36010	3	1433	244	2R	0	9	0	0
VEN081	13C	12	10	1	0	1003	0	56	1	0	1	0	0	95
VUG082	400	50355	403	1	5430	0	0	1	34	0	1	32	1	12

APPENDIX I-A (cont'd)

NATIONS	29	30	31	32	33	34	35
	BURDE	LANCH	CHNS	COPO	STRAD	CTRAD	ITRAD
AFG001	0	4	0	0	96	98	406
ALG002	0	2	0	0	11	11	524M
ARG003	0	1	0	0	1719	103MA	960
ALL004	0	1	4	2	3913	319	924
AUS005	0	1	0	2	2070	404	836
REL006	0	2	0	2	7775	213	973
RCL007	0	4	0	2	166	1	992
BRAS08	1	2	0	2	2049	171	922
BUL009	0	3	0	0	98	1112	80
RUR010	85M	3	5	1	261	75	777
CAW011	90M	4	6	0	108	32	771
CAN012	0	5	4	2	10743	328	970
CEY013	64M	2	0	2	390	99	797
CHD014	0	1	0	2	895	17	981
CHA015	26M	4	8	0	831	1191	410
CHG016	20R	3	7	0	533	0	1000
CCL017	0	1	0	2	769	9	588
CCS018	0	2	2	2	186	0	998
CUR019	0	1	4	0	221	506M	693M
CZE020	0	2	0	0	527	2964	151
DE021	0	1R	0	2	2784	171	942
DEM022	0	2	2	2	300	1	997
ECU023	0	2	0	2	251	1	998
EGP024	0	3	0	0	700	398	639
ELS025	0	1	0	1	225	1	906
FIN026	0	8	0	0	141	8	945
FIN027	0	2	0	2	1409	503	736
FNG028	0	1	0	2	9488	565	943
GAF029	0	1	0	0	261	1785	127
GPR030	0	1	0	2	17044	1002	964
GRC031	0	2	0	2	710	127	547
GUA032	0	2	2	2	260	0	1000
HAI033	0	2	0	0	71	0	994
HUN034	0	2	2	2	134	2	987
HUN035	0	2	0	0	331	1617	195
IND036	1	11	4	2	2707	425	864
INS037	3	2	6	1	794	0	1009
IRN038	0	10M	0	2	911	91	909
IRN039	0	1	0	1	792	76	912
IRE040	0	1	0	2	1174	16	980
ISR041	0	12	0	2	746	23	970
ITA042	0	1	0	2	7580	764	903
JAP043	45	1	4	2	7134	523	931
JCR044	0	3	0	2	79	15	835
KCN045	20R	1	4	0	36564	1164	30
KUS046	35R	1	4	1	587	0	1000
LAF047	90K	5	3	1	24	0	995
LES048	0	3	0	2	245	77	760
LIB049	0	5	0	0	413	0	1000
LRY050	0	2	0	0	520	13	976

APPENDIX I-1 (cont'd)

NATIONS	29 EUROPE	30 LATIN	31 CHINA	32 COPPO	33 AFRICA	34 CENTRAL	35 ISRAEL
PENC51	0	2	3	1	1492	7	994
AFR252	53R	3	0	0	0	0	502R
AFR252	0	1	0	2	8124	249	970
AFR252	0	2	3	2	1364	9	994
AFR252	0	3	0	1	194	0	994
AFR252	0	3	0	1	1872	104	947
AFR252	0	1	0	2	0	1000A	0
AFR252	85	1	0	0	0	46	955
AFR252	0	6	0	1	989	0	998
AFR252	1	2	3	2	139	0	998
AFR252	0	2	3	2	32	0	1000
AFR252	0	2	0	1	0	0	0
AFR252	0	3	0	1	0	10	0
AFR252	0	3	0	1	0	0	0
AFR252	0	8	5	2	1209	0	1000
AFR252	0	2	0	2	962	2363	267
AFR252	0	2	0	0	620	11	942
AFR252	0	1	0	0	602	1526	239
AFR252	0	3	0	0	995	0	1000
AFR252	0	1	0	0	0	0	944
AFR252	0	3	0	0	1822	108	944
AFR252	0	3	0	2	5017	310	941
AFR252	0	1	0	2	4422	273	941
AFR252	0	4	0	2	0	87	697
AFR252	0	4R	0	1	201	0	697
AFR252	0	2	3	0	697	0	686
AFR252	0	2	3	0	786	86	901
AFR252	0	3	0	2	2309	27	589
AFR252	0	11	4	1	0	7445	223
AFR252	0	11	4	0	2164	985	926
AFR252	0	1	4	2	12460	235	487
AFR252	0	1	5	2	23621	15	923
AFR252	0	1	0	2	223	6	997
AFR252	0	1	0	2	2430	0	0
AFR252	0	3	5	0	0	4000A	0
AFR252	50R	3	5	0	289	0	1000
AFR252	50R	3	5	0	0	0	1000
AFR252	0R	1	0	0	4	0	1000
AFR252	0R	1	0	0	0	0	1000
AFR252	0R	7	0	0	982	454	683

APPENDIX I-B

ORIGINAL DATA FOR CHINA'S FOREIGN BEHAVIOR

1955 AND 1963

1) UNIT, SOURCE AND FOOTNOTES FOR THE DATA

NO.	VARIABLE NAME	CODE	UNIT	SOURCE AND FOOTNOTES
1	export	EXPOR	x 10 <sup>5</sup> US\$	Eckstein (1966), Table 4-1, B-1, and B-3. Figures were cross-checked against IMF & IBRD. <u>Direction of International Trade, Annual Issues.</u>
2	import	IMPOR	x 10 <sup>5</sup> US\$	same as above.
3	economic aid	ECAID	x 10 <sup>5</sup> US\$	<u>匯情年報</u> , 1967, <u>了了行政經濟學會編</u> , <u>中國政治經濟綜覽</u> , Tokyo, 1964. Footnote for '55: E = Eckstein.
4	diplomat from Peking	DIPFP	index	<u>大公報刊</u> , <u>人民年冊</u> and Doolin and North (1967).
5	diplomat to Peking	DIPTP	index	same as above.
6	treaties	TREAT	number	<u>大公報刊</u> , <u>人民年冊</u> .
7	co-membership in NGO	CONGO	number	<u>世界知識年鑒</u> , and <u>Yearbook of International Organizations.</u>
8	official political visit to object	POFVT	frequency	<u>人民日報</u>
9	official political visit from object	POFVF	frequency	<u>人民日報</u>

(CONTINUED)

APPENDIX I-B  
(CONTINUED)

ORIGINAL DATA FOR CHINA'S FOREIGN BEHAVIOR  
1955 AND 1963

NO.	VARIABLE NAME	CODE	UNIT	SOURCE AND FOOTNOTES
10	non-official political visit	PNOVT	frequency	<u>人民日报</u>
11	economic visit to object	ECOVT	frequency	<u>人民日报</u>
12	economic visit from object	ECOVF	frequency	<u>人民日报</u>
13	cultural visit to object	CULVT	frequency	<u>人民日报</u>
14	cultural visit from object	CULVF	frequency	<u>人民日报</u>
15	concern	CONCN	index (see def. in main text)	<u>人民日报</u>
16	positive communication	POCOM	index	<u>人民日报</u>
17	negative communication	NECOM	index	<u>人民日报</u>



APPENDIX I-3 (cont'd)

OBJECT MATRCS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	EXOR	EXOR	ECAD	DITP	DITP	TREAT	CONC	RCPT	RPVP	PROVT	ECOPT	ECOPT	CULT	CULT
PEL51	3	0	0	0	0	0	15	0	0	2	0	0	0	0
NEP52	CR	CR	42556	10	5	0	4	1	0	0	0	0	0	0
NIM53	76	29	0	10	11	0	12	0	0	1	0	0	1	0
NEJ54	9	4	0	0	0	0	9	0	0	3	0	0	0	0
NIC55	OR	OR	0	0	0	0	4	0	0	0	0	0	0	0
ACR56	18	23556	0	10	10	0	12	0	0	0	0	0	0	1
CUT57	2644	315M	100556	15	15	2	13	0	0	2	0	0	4	3
PAK58	6	317	0	0	0	0	10	0	0	1	0	0	3	0
PAN59	3R	3R	3	0	0	0	8	3	0	0	0	0	0	0
PAR60	3R	CR	0	14	14	0	11	0	0	0	0	0	0	0
PER61	3	0	0	0	0	0	13	0	0	0	0	0	0	0
FHI62	2R	OR	0	0	0	0	7	0	0	0	0	0	0	0
PLU63	356	350	0	15	15	4	19	2	0	0	0	0	3	11
POR64	1	0	0	0	0	0	11	0	0	0	0	0	2	6
RUM65	143	60	0	15	15	4	19	1	0	1	0	0	2	0
SAU66	OR	OR	0	0	0	0	1	0	0	1	0	0	0	0
SPR67	3	0	0	0	0	0	12	0	0	1	0	0	0	0
SRE68	26	19	0	15	15	0	13	0	0	2	0	0	0	1
S4269	149	237	0	0	0	0	13	0	0	0	0	0	1	0
SVR70	2	2	0	0	0	1	13	0	0	0	0	0	0	0
TAI71	0	0	0	0	0	0	5	0	0	0	0	0	0	0
TUP72	0	0	0	0	0	0	11	0	0	0	0	0	0	0
LNS73	9	12	0	0	0	0	13	0	0	0	0	0	0	0
USR74	630	7480	0	16	16	7	19	0	0	5	4	4	0	16
UNK75	325	222	0	11	11	0	13	0	0	6	2	2	1	1
USA76	2	10	0	0	0	0	13	0	0	1	0	0	0	2
LRJ77	0	0	0	0	0	0	13	0	0	0	0	0	0	1
VEN78	0	0	0	0	0	0	13	0	0	0	0	0	0	1
VTS79	11364	1336M	500E	11	11	4	12	0	0	0	0	0	0	0
VTS80	85	0	0	0	0	0	1	0	0	0	0	0	0	0
VEN81	OR	OR	0	0	0	0	0	0	0	0	0	0	0	0
VUC82	38556	44556	0	10	10	0	9	0	0	3	0	0	0	0

APPENDIX I-B (cont'd)

OBJECT NATIONS	15 CONC	16 FOCUS	17 REGIM	OBJECT NATIONS	15 CONC	16 FOCUS	17 REGIM
AFG001	26	8	0	MEX051	1	0	0
ALP002	114	33	0	NEP052	23	9	0
APG003	13	0	0	ATH053	7	2	0
AUL004	16	0	0	NEW054	7	0	0
AUS005	32	0	0	NIC055	2	0	0
BEL006	31	0	0	NOR056	10	4	0
POL007	3	0	0	CUB057	81	29	0
BRJ008	2	0	0	PAK058	51	3	3
BUL009	83	14	0	PAN059	1	0	0
RUK010	162	31	0	PAR060	0	0	0
CAN011	30	0	0	PER061	0	0	0
CAN012	7	0	2	PHI062	13	0	4
CEY013	12	3	0	POL063	171	47	0
CHL014	13	0	0	PCR064	1	0	6
CHT016	87	0	64	RUM065	123	13	0
COL017	1	0	0	SAU066	20	0	0
COS019	10	0	0	SPN067	4	0	0
CUB019	0	0	0	SWE068	23	1	0
CZE020	203	50	0	SWI069	24	0	0
DEN021	11	0	0	SVK070	57	2	0
DDW022	0	0	0	TAI071	12	0	11
EGY023	0	0	0	TUR072	13	0	0
EGP024	96	10	0	UNSC73	0	0	10
ELS025	7	0	0	USP074	1140	353	4
FIN026	0	0	0	UNK075	217	0	84
FIN027	54	17	0	USA076	296	17	941
FRY028	189	6	76	UPA077	2	2	0
GPE029	345	105	0	VEN078	49	13	0
GMW030	103	12	41	VIN079	394	138	9
GRC031	3	0	0	VISO80	47	0	47
GUJ032	6	0	0	YEM081	1	2	0
HAI033	0	0	0	YUG082	154	55	0
PCW034	0	0	0				
HUN035	102	5	0				
IND036	425	56	3				
IRI037	259	46	2				
IRN038	14	0	4				
IRQ039	5	0	0				
IRE040	5	0	0				
ISR041	8	0	0				
ITA042	79	3	0				
JAP043	468	50	74				
JCR044	6	0	0				
KOR045	229	68	0				
KCS046	55	0	33				
LAO047	110	0	0				
LES048	18	0	0				
LBR049	0	0	0				
LBV050	0	0	0				

APPENDIX I-B (cont'd)

PROJECT NATIONS	1 RIFOR	2 RIFOR	3 ICARD	4 RIFPP	5 RIFPP	6 TREAT	7 COMSO	8 RIFPP	9 RIFPP	10 RIFPP	11 RIFPP	12 RIFPP	13 CULT	14 CULT
AF501	OR	OR	0	18	17	8	5	0	2	1	0	0	0	2
AL202	453	137	4ICE	19	19	9	17	1	1	8	1	11	11	14
AM303	1	11	0	0	0	0	37	0	0	0	0	0	0	4
AUL04	136	278	0	0	0	0	37	0	0	0	0	0	0	1
AUS05	31	11	0	0	0	0	44	0	0	0	0	0	0	0
BEL06	77	95	0	0	0	0	41	0	0	6	0	1	1	3
BEL07	OR	OR	0	0	0	0	19	0	0	2	0	0	0	3
BEL08	3	2	0	0	0	0	37	0	0	9	2	0	4	10
BUL09	34	37	0	23	23	4	36	0	0	2	0	0	0	3
BUS10	243	123	120	23	23	2	22	2	0	1	2	3	2	2
CAW11	92	15	53	15	15	6	8	1	1	2	1	1	1	6
CAN12	45	569	0	0	0	0	36	0	0	1	0	0	0	0
CEV13	273	211	50E	16	16	6	29	0	2	5	0	2	1	7
CHL14	0	0	0	0	0	0	33	0	0	5	0	1	1	2
CHL15	10	0	0	0	0	0	12	0	0	1	0	0	0	0
CHL16	1	0	0	0	0	0	33	0	1	1	0	0	0	0
CHL17	1	0	0	0	0	0	17	0	0	0	0	0	0	0
CJS18	OR	OR	0	0	0	0	17	0	0	0	0	0	0	0
CJS19	49562	57562	520	13	13	9	34	1	1	13	1	10	10	19
CAE20	307	241	0	23	23	2	46	0	0	0	0	0	0	0
CEN21	63	6	0	23	23	0	39	0	0	0	0	0	0	0
CEM22	OR	OR	0	0	0	0	12	0	0	0	0	0	0	0
EGP23	0	0	0	0	0	0	24	0	0	0	0	0	0	0
EGP24	187	164	6	17	17	4	29	1	1	1	1	2	2	2
ELS25	OR	OR	0	0	0	0	14	0	0	0	0	0	0	0
ELM26	0	0	0	0	0	0	10	0	0	0	0	0	0	1
FIN27	28	57	0	22	22	2	37	0	0	0	1	0	0	1
FRS28	198	594	0	0	0	0	51	0	0	1	0	0	0	3
GME29	247	104	0	23	23	3	26	1	1	3	0	1	1	4
GRS30	384	154	0	0	0	0	43	0	0	0	0	0	1	0
GRC31	1	0	0	0	0	0	29	0	0	0	0	0	0	1
GUA32	OR	OR	0	0	0	0	18	0	0	1	0	0	0	0
HAI33	0	0	0	0	0	0	13	0	0	0	0	0	0	0
MCW34	OR	OR	0	0	0	0	15	0	0	0	0	0	0	0
IND35	113	129	25	23	23	3	43	0	0	1	0	0	0	2
IND36	3	0	0	23	23	0	49	0	0	0	0	0	0	0
IND37	422562	73	190	23	23	7	29	2	4	25	0	16	16	27
IRI38	0	0	0	0	0	0	28	0	0	0	0	0	0	0
IRI39	113	45	0	15	13	0	22	0	0	0	0	0	0	1
IRE40	9	1	0	0	0	0	22	0	0	0	0	0	0	0
ISH41	0	0	0	5	5	0	35	0	0	0	0	0	0	0
ITA42	178	193	0	0	0	2	46	0	0	0	0	0	0	1
JAR43	701	624	0	0	0	17	48	0	0	45	0	9	9	44
JOR44	19	0	0	0	0	0	15	0	0	14	0	0	0	1
KCN45	819H	417H	283	23	23	8	26	1	1	14	0	17	17	31
KGS46	OR	OR	0	0	0	0	26	0	0	0	0	0	0	0
LAR47	45K	OPA	13E	11	11	2	8	0	3	1	0	0	0	1
LEM48	0	0	0	0	0	0	27	0	0	0	0	0	0	0
LBG49	CR	CR	0	0	0	0	9	0	0	0	0	0	0	0
LNV50	3	0	0	0	0	0	12	0	0	0	0	0	0	0

APPENDIX I-B (cont'd)

OBJECT	1	2	3	4	5	6	7	8	9	10	11	12	13	14
NATIONS	EXPOR	IMPORT	ECALD	DITPP	DITPP	THEAT	CONGO	POFTT	POFTF	FRONT	ECOVT	ECOVT	CULVT	CULVT
MENCS1	0	0	0	0	0	1	35	0	0	2	0	1	1	3
NEP052	3AM	OMA	25	18	17	2	10	0	1	3	0	0	1	0
NTM253	148	129	0	18	19	1	42	0	0	0	2	1	0	3
NEW254	19	49	0	0	0	1	26	0	0	8	0	1	0	0
NIC255	OR	93	0	0	0	0	14	0	0	0	0	0	0	0
NER256	14	33	0	19	18	1	32	0	0	0	0	0	0	0
CUT257	120M	92M	100	23	23	2	21	0	0	2	2	2	2	4
PAR258	55	129	0	0	0	12	28	0	2	0	0	0	0	0
PAN259	OR	OR	0	0	0	0	20	0	0	0	0	0	0	0
PAP260	OR	OR	0	22	22	0	18	0	0	2	0	0	0	0
PER261	0	0	0	0	0	0	24	0	0	1	0	0	0	0
PHI262	0	0	0	0	0	0	44	0	0	2	0	0	0	0
POL263	243	112	0	23	23	3	33	0	0	2	0	1	6	0
PRF264	2	2	0	0	0	0	33	0	0	2	0	0	0	0
RLW265	141	134	0	23	23	8	39	0	0	2	1	2	1	0
SJL266	CP	OR	0	0	0	0	7	0	0	0	0	0	0	0
SPA267	14	0	0	0	0	0	36	0	0	0	0	0	0	0
SOD268	72	47	0	23	23	0	38	1	0	0	1	1	0	0
SMZ269	98	39	0	0	0	0	42	0	0	0	0	0	0	0
SYK270	28	199	82E	17	17	3	17	0	0	0	1	1	0	2
TAI271	0	4	0	0	0	0	18	0	0	0	0	0	0	1
TUR272	0	0	0	0	0	0	28	0	0	0	0	0	0	2
USA273	24	60	0	0	0	0	33	0	0	2	0	0	0	10
USA274	4120	1820	0	24	24	7	45	1	0	3	2	0	6	5
USA275	489	374	0	19	19	2	44	0	0	1	0	0	1	1
USA276	49	69	0	0	0	0	44	0	0	1	1	0	0	2
USA277	0	1	0	0	0	0	26	0	0	0	1	0	0	0
VEN278	2	0	0	0	0	7	33	0	0	3	0	0	0	19
VTA279	400M	189M	225	19	19	0	17	2	1	10	1	5	8	1
VTS280	0	0	0	0	0	0	27	0	0	3	0	0	0	0
VEN281	OR	OR	27	17	5	0	3	1	0	0	0	0	0	0
YUG282	1	0	0	18	18	1	31	0	0	0	0	0	0	0

APPENDIX I-B (cont'd)

OBJECT NATIONS	15 COUNTRIES	16 FOUR	17 RECORD	OBJECT NATIONS	15 COUNTRIES	16 FOUR	17 RECORD
AFG001	54	65	0	MEP051	37	0	0
ALB002	328	94	0	MEP052	93	0	1
ARG003	31	0	0	NTM053	10	0	0
AUS004	19	0	0	ACM054	75	0	0
AUS005	6	0	0	NIC055	6	0	0
BEL006	23	0	0	ADK056	9	2	0
BEL007	4	0	0	CUT057	53	35	0
BRAS04	65	0	0	PAR058	227	67	0
BUL009	47	0	2	PAR059	3	0	0
BUR010	124	32	0	PAR060	3	0	0
CAN011	256	101	0	PER061	16	0	0
CAN012	26	4	1	PHI062	3	0	0
CEY013	140	63	0	POL063	52	4	0
CHL014	34	0	0	POP064	1	0	0
CHL016	52	1	91	PUM065	65	0	0
CHL017	13	0	0	SAB066	2	0	0
COL018	13	0	0	SPR067	3	0	0
COS019	514	159	0	SPT068	20	0	0
CZE020	65	4	71	SPT069	3	0	0
DEN021	13	4	0	SVR070	32	6	0
CCW022	3	0	0	TAT071	3	0	1
ECU023	31	0	0	TUR072	6	0	0
EGP024	90	22	0	UNO073	5	0	4
ELS025	5	0	0	LSP074	142	46	285
ETH026	9	0	0	UNK075	160	0	22
FIN027	21	0	0	USA076	645	6	735
FRY028	144	0	0	URU077	12	0	0
GME029	46	20	4	VEN078	45	0	17
GMW030	55	0	12	VTR079	587	232	0
GRC031	3	0	6	VIS080	183	0	46
GUI032	10	0	0	VEN081	16	6	0
HAI033	3	0	0	YUG082	49	25	62
HON034	0	0	0				
HUN035	52	6	0				
IND036	373	66	583				
IND037	544	123	3				
IRN038	0	0	0				
IRN039	31	4	42				
IRI040	0	0	0				
ISR041	1	0	0				
ITA042	27	0	0				
JAP043	692	41	14				
JOR044	0	0	0				
KOR045	750	447	0				
KOS046	36	0	0				
LAO047	391	74	2				
LEB048	1	0	0				
LIB049	0	0	0				
LBY050	0	0	0				

APPENDIX II-A

COMPARISON OF A-SPACE ROTATED FACTOR LOADINGS:  
ORIGINAL, TRANSFORMED, REDUCED, AND  
REDUCED AND TRANSFORMED DATA, 1955 AND 1963

EXPLANATIONS

- O: Original Data Set (N = 82)
- T: Transformed Data Set (N = 82)
- R: Reduced Data Set (N = 56)
- RT: Reduced and Transformed (N = 56)

Factor technique employed: Component Analysis Rotation  
Criterion: Varimax

In the tables, only the loadings that exceed .30 are given.



APPENDIX II-A

(CONTINUED)

FACTOR LABELS	IV WESTC												V URAID												VI AGRIC											
	1955				1963				1953				1963				1955				1963				1953											
	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT								
1 POPUL																																				
2 AGRIC																																				
3 DEUS-																																				
4 AF-LND																																				
5 EXRND																																				
6 STRPO																																				
7 ORTEL																																				
8 SATEC																																				
9 EXCOM																																				
10 TELER																																				
11 PRISA																																				
12 GUSPC																																				
13 KASPO																																				
14 QSDS																																				
15 PAPER																																				
16 COTTA																																				
17 INDEX																																				
18 BLOK																																				
19 SATE																																				
20 KISS																																				
21 KIMLF																																				
22 USARD																																				
23 URAID																																				
24 UNVOT																																				
25 COLON																																				
26 CATHL																																				
27 PRERE																																				
28 VOTAN																																				
29 BAKER																																				
30 LAVER																																				
31 CEMIS																																				
32 SOEPO																																				
33 BTRAD																																				
34 CTRAD																																				
35 ITRAD																																				

(CONTINUED)

APPENDIX II-A  
(CONTINUED)

FACTOR LABELS	VII ORIN												VIII DIVER												IX WELFA											
	1955				1963				1955				1963				1955				1963				1955				1963							
	T	R	RT	R	T	R	RT	R	T	R	RT	R	T	R	RT	R	T	R	RT	R	T	R	RT	R	T	R	RT	R								
1 POPUL	0	7	6	5	0	5	10	5	0	8	9	11	0	10	10	12	0	9	9	9	0	9	9	9	0	9	9	9	0	9	9	9				
2 ABEAT																																				
3 DEBAT																																				
4 ABLEID																																				
5 EXPRO																																				
6 STERO																																				
7 GMPFL																																				
8 MTRC																																				
9 EMON																																				
10 TELAN																																				
11 PERSI																																				
12 GPPC																																				
13 MAGPO																																				
14 GENDS																																				
15 FORCE																																				
16 COMFL																																				
17 DEFEX																																				
18 MASH																																				
19 CONST																																				
20 KILLF																																				
21 KILLF																																				
22 USAID																																				
23 CRAID																																				
24 UNWPT																																				
25 COLON																																				
26 CATYL																																				
27 PROTS																																				
28 NUSKX																																				
29 KUDKH																																				
30 LANGH																																				
31 CHIPS																																				
32 GCPPO																																				
33 KCPAD																																				
34 KCPAD																																				
35 ITRAD																																				

(CONTINUED)



APPENDIX II-A  
(CONTINUED)

FACTOR LABELS	XIII POONF										XIV USAID									
	1955					1963					1955					1963				
	O	T	R	HT	0	T	R	HT	0	56	O	T	R	HT	0	T	R	HT	0	60
1 POPUL																				
2 AREAT																				
3 DENST																				
4 AREND																				
5 EUPRO																				
6 STPRO																				
7 GNPFL																				
8 LIIRC																				
9 ESCOM																				
10 TELPH																				
11 PMSI																				
12 GSEPPC																				
13 MAGPO																				
14 GEONS																				
15 FORCE																				
16 COMEL																				
17 DEFEX																				
18 BLOCY																				
19 CO*ST																				
20 KILLD																				
21 KILLF																				
22 USAID	92	91	-94	-94	92	91	91	-94	-94	92	91	91	-94	-94	92	91	91	-94	-94	92
23 URAID																				
24 UNVOT																				
25 CUCON																				
26 CACHL																				
27 PROTS																				
28 WOSAN																				
29 BUDCH																				
30 LAGCN																				
31 CHINS																				
32 GOPPO																				
33 WTRAD																				
34 CTRAD																				
35 ITRAD																				

APPENDIX II-B

COMPARISON OF B-SPACE ROTATED FACTOR LOADINGS:  
ORIGINAL, TRANSFORMED, REDUCED, AND  
REDUCED AND TRANSFORMED DATA, 1955 AND 1963

EXPLANATIONS

O: Original Data Set (N = 81)

T: Transformed Data Set (N = 81)

R: Reduced Data Set (N = 55)

RT: Reduced and Transformed (N = 55)

Factor technique employed: Component Analysis Rotation  
Criterion: Varimax

In the tables, only the loadings that exceed .30 are given.

APPENDIX II-B  
(CONTINUED)

FACTOR LABELS	I TRADE												II TRADE												III TRADE											
	1955				1963				1967				1955				1963				1967				1955				1963				1967			
	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT	O	T	R	RT				
1	97	89	96	-86	72	88	-84	-74	90	-87	92	89	-96	95	97	96	96	-75	76	63	-60	79	76	81	79	79	76	81	79							
2	93	92	97	-83	88	88	-84	-91	90	-86	92	88	-96	95	97	97	97	-86	82	85	-83															
3																																				
4																																				
5																																				
6																																				
7																																				
8																																				
9																																				
10																																				
11																																				
12																																				
13	67	76	69	-79																																
14	54	53	50	-69																																
15	33	73	81	-75																																
16	92	83	92	-30																																
17																																				

The order appeared in original computer outputs. (CONTINUED)

APPENDIX II-B  
(CONTINUED)

FACTOR LABELS	IV ECAID										V NECOM									
	1955					1963					1955					1963				
	O	T	R	RT	RT	O	T	R	RT	RT	O	T	R	RT	O	T	R	RT		
YEAR																				
KIND OF DATA																				
FACTOR ORDER																				
1	EXPOR																			
2	IMPOR																			
3	ECAID	96	-92	-96	93	88	-74	-86	-75											
4	DIPTP																			
5	DIPTP																			
6	TREAS																			
7	CONGO																			
8	POFVT					64	-35	-68	-84											
9	POFVF																			
10	PROVT																			
11	ECOVF																			
12	ECOVF																			
13	CULVT					56	-51	-57												
14	CULVF																			
15	CORCH					65		-65	-51											
16	POCOM																			
17	NECOM																			

(CONTINUED)



APPENDIX III-A

FACTOR SCORES OF FOURTEEN ROTATED  
ATTRIBUTE SPACE BASIS DIMENSIONS, 1955 AND 1963

1) EXPLANATIONS

Kind of raw data: Original Data Set (N = 82)

Number of variables in raw data set: 35

Factor technique employed: Component Analysis

Rotation criterion: Varimax

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NOT REPRODUCIBLE

APPENDIX III-4 (cont'd)

WATSONS	I POWER	II FORAGE	III DEVEL	IV RESTR	V URAD	VI AGRIC	VII CRIM	VIII DIVER	IX HELPA	X POSTA	XI CFRAD	XII OCEAN
WEM351	C-112516	-0.65754	C-471535	C-322116	C-583005	-0.484009	C-257117	-0.845245	-0.177718	1.271554	-0.141526	0.147117
WEM352	C-050071	C-313143	C-555114	C-555114	-0.113163	0.484009	0.140013	0.344933	7.745524	0.211951	-0.513174	0.141123
WTP353	C-431129	-0.570518	-0.220270	-0.220270	C-105502	1.056430	0.430017	0.504002	0.125121	0.711134	-0.141123	-0.141123
WFA354	C-652113	-0.111104	-0.111104	-0.111104	-0.015555	1.232127	C-660554	0.370509	0.353541	0.141123	1.484007	-0.141123
WIS355	C-112710	-0.050722	C-470574	C-470574	-0.112141	1.232127	-0.695039	0.353541	0.311121	0.141123	0.141123	0.141123
WTS356	C-537227	C-503531	-2.237484	-0.770511	C-252226	-1.234003	-0.242524	0.371125	0.127118	0.141123	-0.141123	0.141123
WU357	C-112557	0.203055	C-313143	C-313143	-0.112141	1.056430	1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVA358	C-050135	-0.501134	1.077084	-1.711144	-0.112141	C-735004	-0.553052	0.141123	0.141123	0.141123	0.141123	0.141123
WVW359	C-027706	-0.703247	1.077084	1.077084	-0.112141	-0.553052	0.141123	0.141123	0.141123	0.141123	0.141123	0.141123
WVX360	C-112516	-0.703247	C-430154	1.114123	-0.211844	1.056430	-0.770506	0.141123	0.141123	0.141123	0.141123	0.141123
WVY361	C-027706	-0.711177	0.711177	1.114123	-0.112141	-0.211844	-0.770506	0.141123	0.141123	0.141123	0.141123	0.141123
WVZ362	C-112553	-0.050722	C-430154	C-430154	-0.112141	C-407118	1.170514	-2.355507	-0.141123	0.141123	0.141123	0.141123
WVA363	C-027706	-0.652141	C-555114	C-555114	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVW364	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVX365	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVY366	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVZ367	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVA368	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVW369	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVX370	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVY371	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVZ372	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVA373	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVW374	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVX375	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVY376	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVZ377	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVA378	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVW379	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVX380	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVY381	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123
WVZ382	C-027706	1.064003	1.064003	1.064003	0.141123	1.056430	-1.234003	0.141123	0.141123	0.141123	0.141123	0.141123

NOT REPRODUCIBLE

APPENDIX III-A (cont'd)

XIII POMP		XIV USAID		XIII POMP		XIV USAID	
NATIONS		NATIONS		NATIONS		NATIONS	
AFG001	-C-276422	AFG051	-C-184795	PER051	-C-184795	PER051	-C-184795
ALB002	-C-422179	AFG052	-C-505027	PER052	-C-505027	PER052	-C-505027
ARG003	-C-525905	ALB003	-C-218215	ATH053	-C-505339	ATH053	-C-505339
AUL004	-C-254416	AUL004	-C-118231	ATH054	-C-504386	ATH054	-C-504386
AUS005	-C-448714	AUS005	-C-448714	ATH055	-C-115428	ATH055	-C-277006
BEL006	-C-205878	BEL006	-C-134351	AGR056	-C-152555	AGR056	-C-152555
BEL007	-C-037551	BEL007	-C-151530	OUT057	-C-504445	OUT057	-C-211752
BRA008	-C-172283	BRA008	-C-855505	PAR058	-C-500805	PAR058	-C-501121
BUL009	-C-251062	BUL009	-C-418175	PAN059	-C-055554	PAN059	-C-055064
BUR010	-C-207271	BUR010	-C-032507	PAR060	-C-002777	PAR060	-C-135182
CAM011	-C-250942	CAM011	-C-215151	PER061	-C-113428	PER061	-C-074111
CAN012	-C-357015	CAN012	-C-176161	PHI062	-C-502719	PHI062	-C-116592
CEY013	-C-221257	CEY013	-C-373352	PCL063	-C-067225	PCL063	-C-132531
CHL014	-C-064151	CHL014	-C-145215	POP064	-C-234930	POP064	-C-002823
CHN015	-C-028302	CHN015	-C-472658	BUW065	-C-231310	BUW065	-C-004565
CHN016	-C-255563	CHN016	-C-603823	SAU066	-C-162216	SAU066	-C-000957
COL017	-C-055348	COL017	-C-352245	SPW067	-C-130516	SPW067	-C-205774
CSO018	-C-075473	CSO018	-C-307230	SHD068	-C-050505	SHD068	-C-415500
CUB019	-C-059455	CUB019	-C-093775	SWZ069	-C-050300	SWZ069	-C-204001
CZE020	-C-270054	CZE020	-C-176255	SYR070	-C-024091	SYR070	-C-277300
DEU021	-C-345060	DEU021	-C-400092	TAI071	-C-121310	TAI071	-C-371310
DNM022	-C-023019	DNM022	-C-080020	TUR072	-C-450710	TUR072	-C-174756
ECU023	-C-074255	ECU023	-C-020280	UNM073	-C-150505	UNM073	-C-152298
EGY024	-C-000572	EGY024	-C-002631	USM074	-C-030070	USM074	-C-001194
ELS025	-C-244584	ELS025	-C-031340	UMK075	-C-500051	UMK075	-C-052055
ETH026	-C-165128	ETH026	-C-051601	USA076	-C-099495	USA076	-C-057027
FIN027	-C-152071	FIN027	-C-022017	URU077	-C-172009	URU077	-C-105212
FNC028	-C-700003	FNC028	-C-101302	VEN078	-C-240112	VEN078	-C-350052
GPE029	-C-130371	GPE029	-C-134211	VIN079	-C-140064	VIN079	-C-300057
GPW030	-C-122391	GPW030	-C-371402	VIS080	-C-310070	VIS080	-C-090010
GRC031	-C-072070	GRC031	-C-240009	YEM081	-C-037501	YEM081	-C-077075
GUA032	-C-075561	GUA032	-C-441223	YUG082	-C-519302	YUG082	-C-201495
HAI033	-C-224397	HAI033	-C-377557				
HCM034	-C-051007	HCM034	-C-051172				
HUN035	-C-030045	HUN035	-C-205496				
IND036	-C-037070	IND036	-C-101051				
INS037	-C-050304	INS037	-C-137576				
IRN038	-C-057007	IRN038	-C-067310				
IRQ039	-C-100005	IRQ039	-C-050704				
IRE040	-C-200215	IRE040	-C-080309				
ISR041	-C-050755	ISR041	-C-051014				
ISR042	-C-200274	ISR042	-C-050704				
JAP043	-C-070030	JAP043	-C-080031				
JOR044	-C-220034	JOR044	-C-150012				
KOM045	-C-170027	KOM045	-C-150030				
KCS046	-C-250031	KCS046	-C-270041				
LAN047	-C-101941	LAN047	-C-130035				
LEB048	-C-347100	LEB048	-C-131711				
LRO049	-C-303753	LRO049	-C-303753				
LRY050	-C-190022	LRY050	-C-047514				



APPENDIX III-A (cont'd)

BATCH	I KURR	II FORIS	III NEVEL	IV NESTC	V NEUFA	VI AMIC	VII USALO	VIII FOOM	IX CHAD	X CRISM	XI FOSTA	XII DIVIA
ME051	C-042296	C-073641	C-533460	C-447115	C-329255	C-583071	C-530102	-0.270544	C-123444	C-722204	C-121407	C-121407
NE052	C-034354	C-507064	C-911103	1-214175	C-835455	C-348673	C-201278	C-917508	C-346413	C-022295	C-022295	C-022295
NE053	C-062839	C-025504	-1-332867	C-122028	C-213126	7-578222	-C-216795	C-186875	1-134560	C-232200	C-232200	C-232200
NE054	C-023103	C-750145	-2-592565	C-485120	-C-476364	-1-013807	C-2777615	C-3465324	C-027205	C-027770	C-347420	C-140540
NE055	C-175437	C-586145	C-725173	C-717746	-C-495566	-C-601455	-0.475538	C-167732	C-0231408	C-027757	C-027757	C-027757
NE056	C-046586	-0-025609	-2-900606	C-501145	C-161135	-1-338239	-0.547593	7-034225	C-105501	C-249237	C-105501	C-054201
PU057	C-141404	-1-024716	C-522216	2-711222	C-090092	-1-502915	-0.064330	C-246070	C-303061	C-034960	C-034960	C-034960
PA058	C-122261	C-425832	C-672818	C-369486	C-034387	C-041748	2-113022	C-452503	C-319745	2-022500	C-022500	C-022500
PA059	C-316575	C-782278	C-216551	-2-289328	-0.592148	-C-871055	-0.272547	C-121295	C-214676	C-022171	C-022171	C-022171
PA060	C-173165	C-041737	C-953474	-0.535205	-0.252413	-1-177675	-0.446592	C-138605	C-074950	C-045004	C-045004	C-042004
PE061	C-172624	C-055517	C-024503	C-513607	-C-328212	-C-583131	-C-530379	C-006272	C-263330	C-762015	C-005502	C-005502
PM062	C-232653	2-045535	C-522027	C-332258	-C-786763	1-024106	-0.571624	-0.177511	-0.014346	-0.703957	C-105512	2-343983
PE063	C-324644	-2-216259	C-222102	1-264735	-C-321318	C-896550	-0.073124	2-532670	-C-183740	2-532691	C-055555	C-055555
PE064	C-153185	C-316257	C-940391	-0.523746	-C-016286	C-065400	-C-375466	C-255077	-C-151312	C-042691	C-161345	C-074700
PU065	C-033773	-2-371253	C-276955	-0.448433	-0.491152	-0.242504	-0.027413	C-453532	-C-166158	C-217002	C-176033	C-152322
SA066	C-022541	C-195449	C-725505	-C-394200	C-786356	-C-868383	-1-033079	-0.782234	C-046158	C-247505	C-193547	C-022541
SP067	C-041973	-0-07643	C-070541	-0.731350	-C-478751	C-344455	-0.677412	-0.042375	-0.375454	C-545053	C-255136	C-121050
SM068	C-750657	C-030436	3-132700	C-405066	-0.374530	-1-316252	C-474301	-C-247124	C-242273	C-355576	C-134362	C-443071
SM069	C-547300	C-124181	-2-306966	-0.225628	-C-051350	C-029022	-C-055920	-0.248289	C-369333	C-074243	C-240041	C-437051
SM070	C-117465	C-052293	C-509354	C-005763	-C-343938	C-114742	C-047859	-0.445132	-C-082485	1-495073	C-240743	C-027001
TA071	C-005915	C-750035	1-193669	3-075235	-C-005123	-C-150210	-C-756536	C-230135	-C-103163	C-746365	C-225537	C-160573
TU072	C-125225	C-714435	C-812348	-C-174407	-C-580370	C-222232	1-347915	C-560097	C-020453	2-332255	C-146892	C-146892
UN073	C-375336	C-220010	C-535651	C-591103	-C-110146	-C-876879	-1-439314	-0.323564	C-070700	C-502717	C-141004	C-141004
LS074	-4-135522	-1-744181	C-035927	C-033435	-0.340178	-C-682513	-C-376101	C-060137	C-050337	C-011953	C-141004	2-020000
LS075	C-033367	C-694676	-2-167554	C-072747	C-616365	1-277751	C-066337	C-025731	C-347589	C-111419	C-130703	C-044601
LS076	-2-012004	C-066632	-1-500242	2-150403	C-075036	-C-748621	-C-244350	C-244451	C-072427	C-175163	C-055026	C-055026
LA077	C-044315	C-034500	C-003254	-1-030305	-C-736029	-C-816574	C-034931	C-140374	C-149247	C-074226	C-150734	C-054304
VE078	C-000103	C-259730	C-112546	C-372182	-C-466002	-C-716150	C-044511	C-144451	C-125512	C-045442	C-151426	-0-750034
VR079	C-022507	-1-193531	C-661526	2-002474	-C-492208	-C-155812	-C-063529	C-101154	C-048168	C-400050	C-120193	-0-251875
VS080	C-055643	C-594546	C-429065	C-562004	C-178913	C-116639	C-017200	C-025125	C-000150	C-211514	0-536202	C-232600
VE081	C-069242	C-000405	C-201815	-C-875574	3-41337	0-464628	-C-339290	C-385304	C-000260	1-395104	0-319144	-1-433175
VU082	C-061658	-1-064141	C-371540	-0.500045	-C-498762	-0.402019	-C-673683	0.152647	-0.965274	-C-037845	0-085723	1-519276

APPENDIX III-A (cont'd)

XIII		XIV		XIII		XIV	
NATIONS	COLOM	URAI	NATIONS	COLOM	URAI	NATIONS	COLOM
AFG001	0.594550	0.762405	MEX051	0.113413	0.255121	MEX051	0.113413
AL0022	0.273143	0.462034	NEP052	0.313183	0.502077	NEP052	0.313183
ARG003	0.588223	0.609527	NTM053	1.007255	1.028192	NTM053	1.007255
AUL004	1.955542	0.941479	NEW054	1.927241	0.823211	NEW054	1.927241
AUS005	1.113404	0.204742	NIG055	0.264750	0.122322	NIG055	0.264750
BEL006	0.525587	1.501342	NOR056	0.271200	1.345042	NOR056	0.271200
BEL007	0.464129	0.265431	OCU057	0.473223	1.007005	OCU057	0.473223
BRA008	0.230057	0.101116	PAN058	0.193105	0.372019	PAN058	0.193105
BUL009	0.743232	2.743232	PAN059	0.193105	0.164215	PAN059	0.193105
BUR010	0.584087	0.674842	PAP060	0.124322	0.120422	PAP060	0.124322
CAN011	1.813203	0.637521	PER061	0.124322	0.423222	PER061	0.124322
CAY012	1.455728	2.023222	PHI062	0.243222	0.110005	PHI062	0.243222
CEY013	0.433245	1.007005	POL063	0.193105	0.457742	POL063	0.193105
CHI014	0.544587	0.354742	POR064	0.003014	0.473222	POR064	0.003014
CHP015	0.682688	1.425031	RUM065	0.231221	0.317221	RUM065	0.231221
CHT016	0.400745	0.445745	SAU066	0.200058	0.485008	SAU066	0.200058
CLL017	0.623448	0.149042	SPR067	2.717229	0.113174	SPR067	2.717229
CDS018	0.133474	0.601340	SRG068	0.007205	0.918423	SRG068	0.007205
CUS019	0.645428	0.602042	SRZ069	1.134047	0.210012	SRZ069	1.134047
CZ0020	1.002042	0.303011	SYR070	0.654429	1.001142	SYR070	0.654429
DEM021	0.793404	2.441521	TAI071	1.013229	0.210012	TAI071	1.013229
DEM022	0.119387	0.304042	TUR072	0.004221	1.001574	TUR072	0.004221
EGU023	0.145425	0.433245	UNSC73	0.015424	0.001312	UNSC73	0.015424
EGP024	0.300047	0.433245	USP074	0.003004	1.013174	USP074	0.003004
ELS025	0.005003	0.001102	UNK075	1.003017	0.373216	UNK075	1.003017
ETH026	0.004743	0.001102	USA076	0.002042	0.702422	USA076	0.002042
FIN027	0.300170	1.001031	URC077	0.491121	0.020022	URC077	0.491121
FRO028	1.028170	0.001475	VER078	0.074842	0.002074	VER078	0.074842
GBR029	0.505005	1.007027	VIR079	0.014450	1.003012	VIR079	0.014450
GBR030	1.000016	0.003013	VTS080	0.015003	0.005001	VTS080	0.015003
GRC031	0.004475	1.001205	YEM081	0.033220	0.002272	YEM081	0.033220
GUS032	0.170029	0.284422	YUG082	0.153743	0.155447	YUG082	0.153743
HAI033	0.003454	0.001520					
HUN034	0.132025	0.001474					
MUN035	0.157524	0.002023					
IND036	0.254456	1.001174					
IND037	0.234459	0.001002					
IRN038	0.007504	0.117412					
IRI039	0.003102	0.003005					
IPR040	0.007205	0.003010					
ISR041	1.000026	0.000740					
ITA042	0.003014	0.000740					
JAP043	1.004027	0.004870					
JOR044	0.003005	0.004450					
KOR045	0.003015	0.003009					
KSC046	0.001136	0.020022					
LAV047	0.001147	0.004450					
LEB048	0.003012	0.003014					
LIB049	0.000021	1.022700					
LIB050	2.021000	0.005180					

APPENDIX III-B

FACTOR SCORES OF SEVEN ROTATED  
BEHAVIORAL SPACE BASIS DIMENSIONS, 1955 AND 1963

1) EXPLANATIONS

Kind of raw data: Original Data Set (N = 81)

Number of variables in raw data set: 17

Factor technique employed: Component Analysis

Rotation criterion: Varimax

Case: Dyads with China as the actor; e.g., CHN+Object Nations.  
In the table, only names of object nations are printed.

NOT REPRODUCIBLE

APPENDIX III-B (cont'd)

2) 1955 DATA

OBJECT HAYGENS	I TRADE	II FOUR	III INDIP	IV FOUR	V MEXCO	VI COMCO	VII VISIT
AF0021	C-218358	C-326358	C-804169	C-130343	C-030100	1-710791	C-210233
ALR002	C-170971	1-334520	C-410663	C-130343	C-030100	1-710791	C-210233
ARG003	C-294545	C-280739	C-822110	C-407038	C-285723	C-170730	C-210233
AUL004	C-250620	C-822110	C-101701	C-203742	C-044575	C-050301	C-210233
AUS005	C-150005	C-060218	C-438580	C-050301	C-161020	C-161020	C-210233
BEI006	C-170002	C-090125	C-382743	C-210301	C-310309	C-050301	C-210233
BEI007	C-150356	C-040248	C-227312	C-070074	C-210309	C-050301	C-210233
BR008	C-200573	C-070791	C-173338	C-356513	C-160140	C-050301	C-210233
BUL009	C-240350	1-431251	C-173338	C-356513	C-160140	C-050301	C-210233
BUP010	C-250597	2-927003	C-262489	C-588888	C-160140	C-050301	C-210233
CAM011	C-030745	C-045485	C-282810	1-050610	C-160140	C-050301	C-210233
CAN012	C-221342	C-040750	C-497235	C-130343	C-170747	C-050301	C-210233
CEV013	C-017601	C-011621	C-307310	C-236874	C-311314	C-050301	C-210233
CHL014	C-218070	C-822110	C-170730	C-030355	C-221152	C-160140	C-210233
CMT016	C-060285	C-045485	C-170730	C-030355	C-221152	C-160140	C-210233
COL017	C-040574	C-070589	C-070730	C-050301	C-050301	C-050301	C-210233
COS018	C-013503	C-050112	C-160140	C-130343	C-170730	C-050301	C-210233
CUS019	C-010546	C-050424	C-380411	C-130343	C-160140	C-050301	C-210233
CZ020	C-300325	1-311027	C-380411	C-442433	C-160140	C-050301	C-210233
DEM021	C-011703	2-100272	C-685914	C-070118	C-050301	C-050301	C-210233
DOR022	C-060573	C-040740	C-359374	C-190373	C-160140	C-050301	C-210233
EG023	C-200584	C-050005	C-413736	C-130343	C-160140	C-050301	C-210233
EG024	C-200584	C-060242	C-160140	C-030355	C-160140	C-050301	C-210233
ELS025	C-060573	C-040740	C-307374	C-130343	C-160140	C-050301	C-210233
EL026	C-050557	C-050117	C-290400	C-050301	C-160140	C-050301	C-210233
FIN027	C-0309080	2-352334	C-160140	C-020400	C-160140	C-050301	C-210233
FIN028	C-040305	C-0904518	C-280114	C-220240	C-160140	C-050301	C-210233
GRE029	1-040002	C-181008	C-040740	C-050301	C-160140	C-050301	C-210233
GRO030	C-250322	C-0804370	C-030402	C-140757	C-2306814	C-050301	C-210233
GRO031	C-010184	C-0602049	C-010301	C-110572	C-160140	C-050301	C-210233
GRO032	C-010184	C-0602049	C-030402	C-110572	C-160140	C-050301	C-210233
HAI033	C-050557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
HAI034	C-010184	C-0602049	C-030402	C-110572	C-160140	C-050301	C-210233
HAI035	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND036	C-010184	C-0602049	C-030402	C-110572	C-160140	C-050301	C-210233
IND037	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND038	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND039	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND040	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND041	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND042	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND043	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND044	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND045	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND046	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND047	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND048	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND049	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233
IND050	C-060557	C-040107	C-280466	C-050301	C-160140	C-050301	C-210233

NOT REPRODUCIBLE

APPENDIX III-B (cont'd)

OBJECT NATIONS	I TRADE	II FDI/F	III INRIP	IV FCALD	V RECON	VI COMMO	VII VISIT
MEX051	-0.228576	-0.622935	C.106895	C.272466	C.201037	-1.162731	1.417522
MEX052	-0.249745	C.631525	C.596115	-C.627450	C.110174	1.232524	-C.333501
NIM053	-C.423387	1.494047	C.403192	-0.124755	C.095791	-C.695615	-C.124365
NE054	-0.233288	-0.795626	-0.158807	C.621604	C.272378	-C.654625	C.537559
NIC055	-C.482223	-0.493066	C.293928	-C.230011	C.174571	1.178745	-C.639116
NOR056	-0.463934	1.119629	0.275508	-C.157144	C.245651	-C.174564	-1.013305
CUI057	0.137149	2.213547	0.355139	0.746355	0.145936	-C.175506	-C.315216
PAR058	0.257420	-0.242550	0.232246	-0.440692	C.197565	C.437000	-C.155623
PAN059	-0.125628	-0.277034	0.354140	-C.126572	C.151177	C.321757	-C.455910
PAP060	-0.674335	1.673397	C.602975	-1.057461	0.033047	C.141645	-C.222909
PER061	-0.242295	-0.615425	C.428642	-C.102265	C.156267	-C.606644	-C.444221
PHI062	-0.076648	-0.511354	0.337573	-C.165885	C.135752	0.586517	3.783555
POL063	C.414072	1.434022	1.315643	-1.794843	C.152505	-1.311277	-0.166359
PCY064	-C.195676	2.575111	C.460282	-0.126177	C.135433	-C.270533	C.510742
RUM065	-0.243369	2.195538	-C.326711	-1.527435	C.202462	-1.324635	0.012404
SAU066	0.209505	-0.087504	C.237719	-C.484304	C.190701	2.742754	-0.214700
SPN067	-0.234721	-0.086120	0.236961	-C.057410	0.222744	-C.435555	-0.353496
SRD068	-C.976107	1.665618	-0.713776	-0.194246	-0.213212	0.196419	-C.205753
SRZ069	C.037370	-0.544172	C.477822	-C.271890	-0.295576	-0.575287	-C.011359
SY4070	-C.179180	-3.649144	C.076202	0.073985	0.243146	-C.424454	C.412151
TAI071	-C.057388	-0.470847	C.399088	-0.192227	0.265135	-C.582649	-0.156342
TUR072	-C.171253	-0.590298	C.399334	-C.122760	C.140265	-C.205165	-0.220346
UMS073	-C.218763	-0.614535	C.434134	-C.153436	C.117714	-C.507722	-1.216372
LSR074	0.470234	0.261534	-C.217568	-1.165700	C.259404	-C.192235	-1.252334
UNK075	-C.324558	C.829194	-C.959261	-0.692132	-0.259164	-0.316511	-0.194857
USA076	0.136754	-0.260512	C.681462	-0.104136	-8.765745	-C.345459	0.560534
USA077	-C.430665	-C.939575	-C.475373	0.057951	C.156590	-C.254743	-C.423241
VEN078	-0.134907	-C.712804	C.464245	-0.037511	C.149337	-C.257737	-C.454320
VIN079	1.307655	-0.047865	-0.473507	8.213175	-0.246422	-C.264419	1.136555
VIS080	C.500625	-C.405675	0.260265	-C.230374	-C.300092	1.054793	C.154230
VEN081	C.639354	-0.381875	0.234478	-C.241556	0.172790	1.972463	-1.194307
YUG082	0.264925	1.769136	-0.523064	-C.776593	0.608290	0.803064	-C.226925

NOT REPRODUCIBLE

APPENDIX III-B (cont'd)

3) 1963 DATA	I	II	III	IV	V	VI	VII
COUNTRY	INDIP	TRANS	FDI/Z	ICAI/D	RECOM	VISIT	CRAGO
AFGCC1	0.041354	0.106225	-1.175213	-1.241603	-0.111091	2.444774	1.500743
ALR032	0.042755	0.154529	-0.506774	3.424337	-0.712467	2.702272	0.110367
ARG003	-0.029361	0.278287	0.710547	0.013037	-0.246315	-0.120754	-0.025503
ALL004	-1.032361	-3.125937	1.012255	0.133331	-0.013923	0.032355	-1.023805
AUS005	0.042755	0.225297	0.225297	0.133331	-0.013923	-0.127114	1.075527
BEL006	0.038961	0.077556	0.038961	0.111663	0.037119	0.136324	0.440331
BEL007	-0.130221	0.158251	0.757113	-0.172731	0.140701	0.136324	0.140313
BRA008	1.070187	0.156477	0.644554	0.037119	0.032355	1.121734	-0.042820
BUL009	0.130356	0.077247	1.055331	-0.733374	-0.067428	1.032517	1.026172
BUR010	-0.317975	0.445051	-1.771953	1.044374	0.457765	0.392203	2.121743
CAN011	0.284904	0.125475	-0.752324	0.724029	0.377631	0.227331	1.015527
CAN012	-0.720703	-1.272514	1.102844	0.170078	-0.371241	0.227331	0.021740
CEV013	0.286384	0.102333	-0.720334	0.023334	-0.241443	2.442447	0.021740
CHL014	-0.115894	0.355233	0.772231	-0.250756	-0.274143	0.021740	-0.021740
CHY015	-0.252788	0.158762	0.725039	0.037119	0.657395	0.246191	1.027745
CEU017	-0.417661	0.175864	0.090624	0.047370	0.090624	1.028215	0.025232
CES018	-0.320594	0.171527	0.708311	0.012534	-0.110741	0.211175	0.705793
CUA019	1.567793	-1.059736	0.791257	0.712247	-0.230736	0.221143	1.044374
CAF020	-0.448225	-0.034721	-1.575573	-0.432316	0.095348	0.003193	1.044374
CEN021	0.535462	0.253353	-1.064314	0.037119	-0.095348	0.220234	1.013315
CEU022	-0.214761	0.133204	0.710547	0.104437	-0.037119	1.021143	1.021143
ECU023	-0.302330	0.239315	0.710547	0.104437	-0.037119	1.021143	1.021143
EGP024	-0.135115	0.031141	-1.021143	-0.104437	0.037119	0.037119	0.037119
ELS025	0.220514	0.146734	0.711026	0.117026	0.037119	0.037119	0.037119
ELI026	0.270344	0.130571	0.710547	0.104437	0.037119	0.037119	0.037119
FIN027	0.263312	0.040523	-1.703227	0.037119	0.037119	0.037119	0.037119
FRY028	-0.210324	-0.511223	0.037119	0.037119	0.037119	0.037119	0.037119
GPE029	-0.150172	0.000453	-1.095125	-0.031159	0.037119	0.037119	0.037119
GRE030	-0.487617	-0.374251	0.037119	0.037119	0.037119	0.037119	0.037119
GRC031	-0.340646	0.237623	0.037119	0.037119	0.037119	0.037119	0.037119
GUL032	-0.273310	0.177494	0.711026	0.037119	0.037119	0.037119	0.037119
HAI033	-0.210324	0.164493	0.710547	0.104437	0.037119	0.037119	0.037119
HCU034	-0.270344	0.146734	0.710547	0.104437	0.037119	0.037119	0.037119
HUN035	-0.340646	0.237623	0.037119	0.037119	0.037119	0.037119	0.037119
IRI036	-0.210324	0.164493	0.710547	0.104437	0.037119	0.037119	0.037119
IRI037	1.050225	0.211073	0.037119	0.037119	0.037119	0.037119	0.037119
IRI038	-0.270344	0.223255	0.037119	0.037119	0.037119	0.037119	0.037119
IRI039	-0.452209	0.226070	0.037119	0.037119	0.037119	0.037119	0.037119
IRE040	-0.351155	0.175864	0.037119	0.037119	0.037119	0.037119	0.037119
ISR041	-0.021554	0.345057	0.037119	0.037119	0.037119	0.037119	0.037119
ITA042	-0.040351	-0.223255	0.037119	0.037119	0.037119	0.037119	0.037119
JAP043	7.032242	-0.166000	1.057114	0.037119	0.037119	0.037119	0.037119
JEC044	-0.030770	0.175864	0.037119	0.037119	0.037119	0.037119	0.037119
KCS045	3.036634	0.255236	0.037119	0.037119	0.037119	0.037119	0.037119
KCS046	-0.345307	0.244493	0.037119	0.037119	0.037119	0.037119	0.037119
LEU047	-0.221147	0.241465	-0.196144	0.037119	0.037119	0.037119	0.037119
LEU048	-0.366078	0.215210	0.037119	0.037119	0.037119	0.037119	0.037119
LEU049	-0.306124	0.112514	0.037119	0.037119	0.037119	0.037119	0.037119
LEU050	-0.316453	0.126594	0.037119	0.037119	0.037119	0.037119	0.037119

NOT REPRODUCIBLE

APPENDIX III-3 (cont'd)

SUBJECT MATRICES	I IMDP	II TRMS	III TDIR	IV PCAD	V MCON	VI VISIT	VII COMO
MEK51	-C.00607	0.37743	C.70423	-C.11224	-C.27456	-0.79551	-C.71254
NEP52	-0.23146	0.551236	-C.928742	-C.43651	-0.00474	1.10736	1.151162
NTW53	C.409371	-0.010730	-1.473451	-0.780681	-0.23923	-1.561742	-C.2452-3
NIW54	C.238881	0.256422	C.354213	-0.352466	-0.103155	C.77765	-C.6571-7
NIC55	-0.37005	0.142437	C.711410	-0.155342	-0.102357	-C.22395	C.5522-4
NIC56	0.454325	2.422413	-1.142846	-0.47422	C.27272	-0.102134	-0.220113
CUC57	C.274525	C.416760	-1.447071	0.142157	-0.238493	-1.10257	C.21176
PAK58	2.023340	-0.156017	C.333543	-1.346272	-0.137013	1.401741	1.17045
PAN59	-C.341922	0.140135	C.692572	-0.121258	-0.154460	-C.202335	7.531025
PAR60	-0.412725	C.456054	-1.456178	-0.344555	-0.171452	-C.224674	0.444303
PER61	-C.328047	C.240160	C.067414	-C.022633	-C.252428	-0.146127	-C.142528
PHI62	-0.355472	0.203599	C.660721	-0.057237	-C.136035	-C.154426	C.225516
PCL63	-C.056339	0.271623	-1.583669	-C.234078	-C.236160	C.722164	-1.737662
PCR64	-C.318155	0.252145	C.052440	-C.049322	-0.157056	-0.177745	-0.458121
RUW65	C.762329	0.158863	-1.852750	-0.522427	-C.555217	-C.425750	-C.720742
SAB66	-C.793341	0.104691	C.737674	-0.135451	-C.570263	-C.228520	1.485773
SPR67	-C.347025	0.255708	C.644018	-0.028454	-C.75447	-0.165555	-C.651540
SBD68	-C.625446	0.347193	-1.674542	0.245425	-C.457302	-C.224716	-0.521429
SNZ69	-C.035042	-C.003342	C.493354	-0.213245	-C.336318	-C.27217	-C.551435
SNK70	-C.335660	0.154433	-C.822047	C.067211	-C.591174	-C.30330	C.266475
TAL71	-C.307270	0.173065	C.712766	-0.125226	-0.126750	-C.200735	C.075525
TUP72	-C.367502	C.225759	C.076320	-0.071126	-C.327742	-0.145616	-C.554210
UMS73	-0.250485	0.149662	C.736114	-C.686376	-C.261345	-0.627416	-C.254055
USK74	C.107112	-7.77513	-1.566514	-C.991668	C.832742	-C.414217	1.146667
UNK75	C.612822	-0.326124	-1.191320	-C.772421	-0.218512	-C.405276	-C.520428
USA76	-C.428240	-C.360057	1.243755	0.167302	6.712704	0.210451	-C.966220
UPR77	-C.054422	0.103740	C.554757	-C.283310	-0.157432	-C.218536	-C.553444
VEN78	-C.251494	0.304145	C.717442	-0.101750	-C.353531	-C.205766	-C.507760
VIN79	1.126705	C.271021	-C.571353	2.225055	-C.426785	-C.076009	1.022724
VIS80	-0.134405	0.412740	C.007012	-C.061053	0.524185	-C.014005	-C.041136
VEN81	-C.706018	0.093194	-C.349343	0.822334	-0.181302	-C.521017	1.855442
VUG82	-C.413951	0.575015	-1.137463	-C.325320	C.376512	-0.234500	-0.307402