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VOLUNTARY INTERNATIONAL COORDINATION

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THE UNIVERSITY OF MICHIGAN

COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS
Department of Political Science

Technical Progress Report # 2
1 January 1972 through 30 June 1972

VOLUNTARY INTERNATIONAL COORDINATION

Raymond Tanter
Principal Investigator

ORA Project 010356

under contract with:

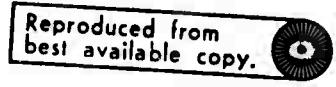
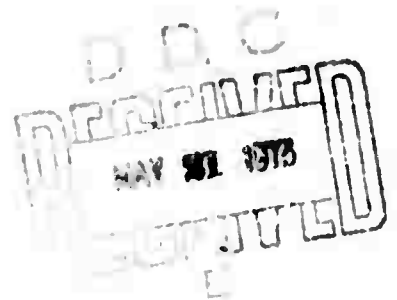
OFFICE OF NAVAL RESEARCH
DEPARTMENT OF THE NAVY
ADVANCED RESEARCH PROJECTS AGENCY
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ARPA Order No. 1411

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Technical Report No. 2 for 1 January 1972 through 31 June 1972

Contract No. N00014-67-A-0181-0042

Principal Investigator: Raymond Tanter

ARPA Agent: Office of Naval Research

Title: Voluntary International Coordination

VOLUNTARY INTERNATIONAL COORDINATION (VIC) PROJECT

RESEARCH PROGRAM AND PLAN

The VIC project has three functions: (1) promotion of convergence among quantitative international affairs projects on theoretical priorities for data generation and modelling, variable definitions, coding rules, and data quality control; (2) purchase of a small number of data sets to stimulate data generation; and (3) development of computer-based models for conflict modelling and management--the Computer-Aided Conflict Information System (CACIS) and the Computer-Aided System for Handling Information on Local Conflicts (CASCON)

ENCLOSED DOCUMENTATION

The first document briefly describes four data sets which VIC generated through purchase orders and recently acquired. The second document is a list of the VIC supported updating of World Event Interaction Survey which was carried out by William Coplin and Michael O'Leary at Syracuse University. The third document is a description of the "Moses Technique Events Interaction Data Analysis Program," which simplifies the analysis of event-interaction data. This program was specifically written to be used with the Barry Hughes (Case Western Reserve University) data set Dyadic and Mutilateral Events: 1948-1970, and was supported by a VIC purchase order. The fourth document is "A Partial Test of a Model on International Interactions Using Issue-Coded Events Data: A Report of the PRINCE Project." The validity testing of the PRINCE model, developed by Michael O'Leary and William Coplin, Syracuse University, has been partially supported by a VIC purchase order.

June, 1972

Four Recently Acquired VIC-Generated Data Sets

John Gillespie and Dina Zinnes. Military Defense Expenditure Data: 1948-1970. Data for 123 nations for military defense expenditures. The data are either in U.S. dollars or national currency with an exchange rate provided. Sources are U.N. Statistical Yearbook; U.S. ACDA publications, and the UN Statistical Bulletin for Latin America. Class IV.

John Gillespie and Dina Zinnes, World Trade Data: 1958-1968. This data set contains export and import trade data collected on a country by country, directional basis. The source is International Monetary Fund Series of annual volumes -- Direction of Trade. All data are reported in U.S. \$. Class IV.

Barry Hughes, Dyadic and Multilateral Events: 1948-1970. Data on 10,000 dyadic and multilateral events involving NATO and Warsaw Treaty nations as well as Peoples' Republic of China, Sweden, North Vietnam, Yugoslavia, North Korea, Mongolia, and Austria. Only actions are included, not purely verbal events such as speeches and resolutions. Events are coded with the Moses/Brody conflict-cooperation scale. The source of the data is Keesing's Contemporary Archive. Class IV.

Robert North, Richard Lagerstrom and William Mitchell, British Speeches 1870-1914 and German Speeches (in German) 1871-1912. This data set contains computer-readable text of British Parliamentary "Speeches in Reply" of 1870 to 1914 (approximately 220,000 words) and the German text of German Reichstag "Speeches from the Throne" of 1871-1921 (approximately 80,000 words). Also included are two British equivalence decks. The first includes (a) geographic equivalences; (b) the full General Inquirer political dictionary; and (c) words from the British text equivalenced under wither a or b. The second equivalence deck is a shortened version of the first with about one hundred key words in three dimensions; geographic, affect and strength. A program call DICTION is available for use with these texts. Class IV.

Data Collected for VIC Project

NOTE: Each foreign policy act is coded onto a punch card; in addition, more aggregated scores will be reported. All of the data is collected for each year of the period 1966-1968, and for the following dyads:

116 dyads	U.S. → target (WEIS)
116 dyads	target → U.S. (WEIS)
30 dyads	PRINCE nations (WEIS)
30 dyads	regional subset of Africa (McGowan)

Variables

issue position and issue difference

- from events data
- from U.N. data

issue-specific influence attempts (from events data)

dependence

- trade RA scores
- Russett factor scores
- number of subsidiaries overseas

reference ratio

- diplomats sent and received
- number of increases and decreases in various types of transaction flows (from events data)

affect

- general expression of affect (from events data)
- student exchanges
- tourism
- mail

salience of issue

- number of acts sent on issue/total number of acts sent (from events data)

power on each issue -- each measure relevant only to certain issues

- GNP
- military expenditures
- export/import ratio
- others, depending on the types of issues found in the data

Moses Technique Events Interaction Data Analysis Program

The purposes of this computer program are to greatly simplify the analysis of events interaction data and to considerably increase the flexibility of that analysis. Events interaction data in their original form are generally unusable -- too many individual bits of information exist for a researcher to analyze systematically. Some sort of summary measures must be created.

Manual or desk calculator computation of such summary measures has three disadvantages. The process of manual computation is considerably more time consuming than computer analysis. Moreover, errors are more likely to be introduced during the tedious, yet complicated process of summarizing the data. Finally, once summary measures are obtained for particular "blocs" or "groupings" of nations, it is nearly impossible to analyze slightly smaller or larger sets of nations without repeating the computation process. The same problem arises when the researcher feels that alternative time units (e.g. half years rather than yearly periods) should be examined. Manual computation just does not provide sufficient flexibility to cope with even slight changes in research procedure.

This computer program, written in Fortran IV for the Control Data Corporation 6000 Computer, and also run on the Univac 1108, is one of two created to summarize events interaction data. This program was written especially to analyze events data coded according to the techniques and with the scale developed by Lincoln Moses, et al.¹ The Moses scale assigns to each event involving an actor nation acting toward a target nation a value from 1 to 30. The values near the low end of the scale are characterized by high level co-operation, while those at the upper end of the scale are characterized by intense conflict.

Analysis Procedures

In the attempt to discover a single or a small number of values which characterize the relations between two nations in a given time period, we must in some way combine the scale values assigned to all the events occurring within the period. Clearly a strict summing procedure is senseless, because a value of 60 could theoretically indicate either 60 interactions of high level co-operation or 2 interactions of intense conflict. An average scale value procedure is a somewhat improved technique, but fails to provide us with an indication of the level of interaction between two nations. That is, an average value of 15 could be based on 1 occurrence of a scale value of 15, or on 20 occurrences of 10 and 20 occurrences of 20.

It was therefore desirable to create individual scales for co-operation and conflict and to sum events for a measure of total co-operation and for a separate measure of total conflict. This was not difficult to do. It was found that Scale B presented by Moses, et al., could be divided between items 11 and 12, with items from 1 to 11 being co-operative, and items 12-30 being conflictual. Items 11 and 12 are:²

11. Nation A invites Nation B to an international Meeting.
12. Nation A initiates universal military training.

The program examines each Moses code score associated with each event. If the score exceeds 11, the code score is normalized by subtracting 11 from

it. Thus a value of 12 becomes a 1 while the value of 30 becomes 19. These are conflictual scores and are used in computing the conflictual summary measures. If the original score on the 30 point Moses scale is less than 12, then 12 is subtracted from the score giving new scores running from -1 (was 11) to -11 (was 1). These values are then normalized by taking absolute values and by multiplying by the value necessary to create a co-operation scale running from 1 to 19 as does the conflict scale. These are, of course, co-operative scores and are used only in computing the summary co-operative measures.

It was also felt valuable to have available (in addition to the average scale value) a summary measure combining both co-operation and conflict, and characterizing the overall relationship between two countries. A measure called "percentage co-operation" was therefore added to the capability of the program.³ This measure is computed as the summed total of co-operative values (as computed using the co-operation scale) divided by the same figure plus the summed total of conflictual values (as computed using the conflictual scale). This measure still fails to suggest the rate of interaction, but it does tap both the level of co-operation and the level of conflict.

Blocs of Nations

In addition to computing four summary measures (total co-operation, total conflict, average scale value, and percentage co-operation), the program also allows the examination of the relationships within and between sets of nations. Any set of nations can be designated a "bloc" and all four measures will be computed for the nations within the "bloc" and for the relations between that "bloc" as a whole and all other designated groupings. This will be presented in addition to a dyadic presentation of all data. The maximum number of nations in a bloc is 30. A bloc may contain only 1 nation. The maximum number of blocs is 19. Blocs can be overlapping in their membership. Thus it is possible to create three blocs such as NATO nations, Warsaw nations, and NATO nations plus France. This allows considerable flexibility in analysis.

Output

The output tables for any single computer run will be:

1. Dyadic Co-operation Table -- total of co-operative scores within each dyad.
2. Dyadic Conflictual Table -- total of conflictual scores within each dyad.
3. Dyadic Average Table -- average score on the original 30 point scale averaged over all event scores within the dyad.
4. Bloc Co-operation Table -- same as dyadic table, but with blocs substituting for individual nations.
5. Bloc Conflictual Table -- same as dyadic table, but with blocs substituting for individual nations.

6. Bloc Average Table -- same as dyadic table, but with blocs substituting for individual nations.
7. Bloc Percentage Co-operation Table -- the values in Table 4 divided by the sum of the values in Tables 4 and 5 (for each bloc dyad).

Sample output is shown on pages A1 through A4.

Punched Card Analysis

The structure of the data deck to be run with this program, including all information on specification of desired bloc structures and the events data input format, is as follows:

Series 1. Bloc Structure Specification. (All formats are 12 unless otherwise noted.)

<u>Card</u>	<u>Columns</u>	<u>Input</u>
1	1,2 3,4	Number of blocs to be analyzed (q) Size of largest bloc
2	1,2....2n	n members of first bloc (2 columns/member-- identification numbers selected from numbering of countries as listed on card r+2) -- a bloc consists of 1 or more member
.		
.		
.		
r	1,2...2m	m members of last bloc
r+1	1,2	Number of countries included in the analysis (p). This should not exceed 31 unless alterations are made in the program.
r+2	1,2....2p	Two letter labels of each of p countries included in the analysis (dyadic output will be in order of countries listed here) Format = A2
r+3	1,2,3,4...4q	Four letter labels of each of q blocs included in analysis (in order of specifi- cation on cards 2....r) Format = A4

As an example of Series 1 input, consider the following cards (data begins in column 1):

1. 0315
2. 020304050607080910111213161718
3. 2022232425262728293031
4. 1921

5. 31

6. AUBECADEFGRGIRIGICITLUNENOPRSWSITUUKUSALBUCICZEHUNOOPORUSUNVYU

7. NATOCOSIALCH

These Series 1 cards would produce the output shown on pages A1-A4 (coupled with particular data from Series 2 cards, of course). Card 1 specifies that there are 3 blocs in the analysis, the largest of which has 15 members. Cards 2, 3, and 4 specify the numbers of the nations in the 3 blocs. The two digit numbers on these cards refer to the countries identified with the two letter labels on Card 6. The first nation in the bloc on Card 2 is identified as 02 and refers to BE (Belgium). Card 5 lists the number of nations in the study, and Card 6 provides a two letter label for each of them (in this case 31). Card 7 provides a four letter label for each of the blocs (3 in this case). The blocs in the example are the NATO nations, the communist nations other than Albania and China, and Albania plus China.

Series 2. Events Data Scores Input Procedure.

<u>Card</u>	<u>Columns</u>	<u>Input</u>
1.1	1,2 3,4 5,6 7,8 9,10... as need	Month of event Year of event Moses score of event Number of countries involved in event Two letter labels of countries involved in event (labels as on card r+2) Format = A2
1.2		Second event -- same as card 1.1
.		
.		
1.n	5,6	-1 (end of time period to be analyzed)
1.n+1	1,2 3,4 5,6 7,8	Month time period began Year time period began Month time period ends Year time period ends
2.1		First event in next sequence; see 1.1
.		
.		
.		
2.n	5,6	-5 (end of last period of events)
2.n+1		See card 1.n+1

Magnetic Tape Analysis

The program as described up to this point will analyze any data for any time period. It was constructed, however, for punched card input. A second version of the program was developed to analyze data on magnetic tape. A listing of this program can be seen on pages A5-A10. No differences exist in output, only in input. Series 1 cards are still required for the operation of the magnetic tape program. One additional card is required in Series 1.

<u>Card</u>	<u>Column</u>	<u>Input</u>
r+6	1,2,3	The number of the tape file (monthly period) at which analysis should begin.
	4,5,6	The increment, i.e. the number of files (monthly periods) to be aggregated for each set of output tables.
	7,8,9	The number of the file at which analysis should cease.

Each file is one monthly period. Files are numbered consecutively by the program. In the events data set for which this program was originally written, June, 1948, is file 1, and December, 1970, is file 271. The files are thus the actual events data and replace the Series 2 cards used with the card analysis program. (A program is available for placing the Series 2 cards on tape in a form compatible with the analysis program.)

FOOTNOTES

1. Lincoln E. Moses, Richard A. Brody, Ole R. Holsti, Joseph B. Kadane, and Jeffrey S. Milstein, "Scaling Data on Inter-Nation Action," Science, vol. 156 (May 26, 1967), pp. 1054-1059.
2. It should be stressed that this is only the case with Moses Scale B. The other three scales cannot be divided at the same point, and thus cannot be analyzed without modifying this program.
3. An additional value of this measure is that it allows comparability of the events data scaled using the Moses Technique with the events data scale using the Corson technique. An average measure was not used in the program summarizing the data coded by the Corson technique. The percentage co-operation measure was used. (See the description of the Corson Technique Events Interaction Data Analysis Program.)

THE BLOC COOPERATION MATRIX IS

	NATO	COMV	ALCH
NATO	732.	0.	0.
COMV	47.	283.	0.
ALCH	0.	0.	0.

THE BLOC CONFLICT MATRIX IS

	NATO	COMV	ALCH
NATO	12.	0.	0.
COMV	30.	77.	0.
ALCH	0.	29.	0.

THE BLOC AVERAGE MATRIX IS

	NATO	COMV	ALCH
NATO	10.44	.00	.00
COMV	11.82	11.05	.00
ALCH	.00	14.36	.00

THE PERCENTAGE COOPERATION MATRIX IS

	NATO	COMV	ALCH
NATO	.98	.00	.00
COMV	.61	.79	.00
ALCH	.00	.00	.00

PROGRAM COMPLETED IN 3.7658 SECONDS.

END OF RUN: DATE: 14 APR 72 TIME: 15:23:57 RUN TIME: 13 SEC. PAGES: 19 CARDS: IN 308 OUT 0

NTRAN
NTRAN
NTRAN

```
10 C=C(P1), M2)=TCP(I1, J1), RCFM
11 RECP(I1, J1)=RCP(I1, M2)01.
C-----SOURCE CARD IMAGE BY POINT TO 70 AND THUS INCREMENTING
C-----
  LCSP AT LOCATION 1
  FC TO 73
  -5 - 53 51. 101
  210)
  -55 JOK. 101
  21011)
  1)=110)
  IF (M1-M2) 27, 50, 50
  27 21=2
  21=1
  55 PATCH(I1, J1)=RCP(I1, M2)+11.
  53 RECP(I1, M2)=RCP(I1, M2)01.
  73 21=101
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00 04 111, MC

01 POINT 01, COMPLET, DISTRICT, J1, J11, K1

02 POINT 01, AGE 2010

03 POINT 01

04 POINT 01

05 POINT 01, 30, 201010, TABLE IS COMPLETE, J1

06 POINT 01, COMPLET, 121, 301

07 POINT 01, 121, 2120, 4211

08 POINT 01, MC

09 POINT 01, COMPLET, DISTRICT, J1, J11, K1

10 POINT 01, AGE 2010

11 POINT 01

12 POINT 01

13 POINT 01, 30, 201010, TABLE IS COMPLETE, J1, J11, K1

14 POINT 01, COMPLET, 121, 301

15 POINT 01, 121, 2120, 4211

16 POINT 01, MC

17 POINT 01, COMPLET, DISTRICT, J1, J11, K1

18 POINT 01, AGE 2010

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20 POINT 01

21 POINT 01, MC

22 POINT 01, MC

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25 POINT 01, MC

26 POINT 01, MC

27 POINT 01

28 POINT 01

29 POINT 01, 121, 121, 110

30 POINT 01, 121, 121, 110

31 POINT 01, 121, 121, 110

32 POINT 01

33 POINT 01

34 POINT 01, COMPLET, DISTRICT, J1, J11, K1

35 POINT 01, AGE 2010

36 POINT 01

37 POINT 01

38 POINT 01, 121, 121, 110

39 POINT 01, 121, 121, 110

40 POINT 01, 121, 121, 110


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1  FOR SUP-50A
2  SUPPLY THE CHECKS LOC
3  REVISE
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