chapter nine

THREAT, TIME, AND SURPRISE: A SIMULATION OF INTERNATIONAL CRISIS*

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DEFINITION OF CRISIS

The Introduction to this volume noted the absence of agreement on the definition of crisis among policy makers, journalists, and scholars. An even greater problem than the divergent definitions of crisis is created by those who use the term and leave to their audience the task of assigning it a meaning. A vague and loosely applied concept has no real value for identifying a class of situations about which useful knowledge can be accumulated. To have utility for scientific theories, crisis must be rigorously defined so that any competent individual can reliably determine whether or not a particular occurrence constitutes a crisis. Not only must the class of phenomena be readily identifiable, but as a set they must enter into theoretical relationships with other concepts. Simply put, the selection of certain events as crises must lead to some knowledge about the entire class of situations.

This research stipulates a definition of crisis.[1] Because of the absence of consensus on the meaning of the term, the definition will deviate from what many people assume to be a crisis. As noted, the utility of the definition depends upon our ability to incorporate the concept in empirically verifiable generalizations or hypotheses which are subsequently confirmed.

For this study a situation is said to be a crisis if, and only if, it (1) threatens one or more important goals of a state, that is, the group of authoritative policy makers who constitute the state, (2) allows only a short time for decision before the situation is significantly transformed, and (3) occurs as a surprise to the policy makers. Not all international situations commonly cited as crises conform to this definition, but a number of such situations do have these characteristics. For example, from the perspective of American policy makers, both the 1950 invasion of South Korea and the 1962 Soviet emplacement of offensive missiles

* In addition to the other contributors to this volume, who commented on this paper at our symposium on international crisis, the author wishes to acknowledge the participants on a panel at the 1967 annual meetings of the American Political Science Association. At that time a version of the paper was presented under the title, "International Crises: Theoretical Implications of Current Research." The panelists were Morton Kaplan, Robert Keohane, Charles McClelland, Linda Miller, and Oran Young. Harold Guetzkow also offered a number of useful comments on that paper.

1. The larger research project which provides the basis for this additional analysis was conducted under Contract N123 (60530) 32779A from Project Michelson at the U.S. Naval Ordnance Test Station, China Lake, Calif. A report of the research findings appears in Charles F. Hermann, *Crises in Foreign Policy* (Indianapolis: Bobbs-Merrill, 1969).

in Cuba were consistent with this definition of crisis. Both occasions constituted major threats to American objectives. With respect to Korea, the policy makers feared that unless they acted within a period of twenty-four to forty-eight hours that country would be overrun. Intelligence supplied President Kennedy and his advisers in the Cuban missile crisis indicated that medium-range ballistic missiles would be operational within a week of their discovery. Although intelligence sources recognized both situations as possibilities prior to their occurrence, the American government in each case had concluded that they were extremely unlikely. Each event came as a surprise.

It is the premise of this research that situations like the Korean and the Cuban crises usually involve certain kinds of processes and decisions unlikely to occur in other situations. More specifically, in situations involving high threat, short time, and surprise, certain behaviors are more likely than when none of these three attributes is present or when only one or two of them exists. Positive evaluation of the proposed definition of crisis depends upon confirmation of this macro hypothesis. Simulation served as the means for the systematic comparison of illustrative decision processes in situations differing in the amount of threat, decision time, and surprise.

USING SIMULATION TO STUDY CRISES

Games and simulations offer the increasing number of interested social scientists a type of model that can represent nonlinear changes in an evolving system. As appreciation of the simulation-gaming technique has grown so have its applications to the study of international crises. Members of the RAND Corporation, early users of gaming in the United States, viewed the analysis of crises as one of the principal reasons for developing the technique. In the RAND-type political games, teams of individuals assume the roles of national leaders to devise policies in response to a particular crisis described in a scenario. Such political gaming of crises has been conducted by governments, research groups, and teaching institutions.[2] Although the greatest number of studies have been conducted with exercises of the RAND variety, the examination of crisis has not been limited to all-man political games. For example, an all-computer simulation has been constructed to replicate the process of information selection and retention that decision makers are assumed to experience in handling crisis communications.[3] The author has been associated with crisis experiments that use still another kind of simulation—a hybrid involving both human participants and highly structured programs.[4]

2. For examples of the RAND Corporation studies see Herbert Goldhamer and Hans Speier, "Some Observations on Political Gaming," *World Politics*, 6 (October 1959), 71–83; Harvey Averch and Marvin M. Lavin, *Simulation of Decisionmaking in Crises*, RAND Memorandum RM-4202-PR, August 1964. For variations and extensions of the RAND type of gaming see Sidney F. Griffin, *The Crisis Game* (Garden City, N.Y.: Doubleday, 1965); Lincoln P. Bloomfield and Barton Whaley, "The Political-Military Exercise," *Orbis*, 8 (Winter 1965), 854–870. See also the previous chapter by David C. Schwartz.

3. Ithiel de Sola Pool and Allen Kessler, "The Kaiser, the Tsar and the Computer," *American Behavioral Scientist*, 8 (May 1965), 31–38.

4. Charles F. Hermann, *Crises in Foreign Policy*; Charles F. Hermann and Margaret G. Hermann, "An Attempt to Simulate the Outbreak of World War I,"

Given the considerable use of political games and simulations to study crises, it is noteworthy that the applicability of these techniques has been sharply questioned. One commentator has stated that "the emotional overtones which always characterize international crises can seldom—if ever—be simulated in the laboratory."[5] Another has observed: "Many simulations of hazardous military performance and missions, judged by experienced officers to be stressful, failed to yield behavior meeting these criteria."[6] Even a user of experimental gaming contends that "if a model of warfare ignores the pain, the fear, and the cost of war it cannot encompass the bargaining process. . . . Without explicit uncertainty it is hard to generate the phenomenon of brinksmanship—of competitive risk-taking, of the game of chicken."[7] If crises are extreme situations with risks of severe punishment and deprivation to those persons and social organizations involved, how can such circumstances be represented in an artificial, simulated system?

No one experiment can determine the appropriateness of the simulation-gaming technique for studying crises. Nevertheless, in this chapter we will make a conscious effort to consider the problem. First, we will direct particular attention to the amount of threat and other affect experienced by the participants; second, we will investigate selected propositions about crisis for which information is available from other sources. To some extent the applicability of the technique depends on the relationship between the manner in which crisis is defined and the kind of simulation employed. The proposed definition of crisis has been advanced. The specific type of simulation used for studying the concept was the Inter-Nation Simulation which will be described in general and then in the particular form used in the research.

Inter-Nation Simulation

This operating model, developed by Guetzkow and his associates,[8] combines the activity of human participants with a set of machine computations. In short, it is a mixed, man–machine simulation. The relationships between variables in the programmed calculations are the established part of the model that remain constant from one simulation trial or run to another. The participants, assigned in groups of two or more to one of several nations, assume roles in the foreign policy organization of their nation.

American Political Science Review, 61 (June 1967), 400–416; and James A. Robinson, Charles F. Hermann, and Margaret G. Hermann, "Search Under Crisis in Political Gaming and Simulation," in Dean Pruitt and Richard C. Snyder, eds., *Theory and Research on the Causes of War* (Englewood Cliffs, N.J.: Prentice-Hall, 1969), pp. 80–94.

5. Robert H. Davis, "The International Influence Process," *American Psychologist*, 21 (March 1966), 240.

6. Meredith P. Crawford, "Dimensions of Simulation," *American Psychologist*, 21 (August 1966), 794.

7. Thomas C. Schelling, "War Without Pain," *World Politics*, 15 (April 1963), 465–485.

8. More detailed descriptions of the Inter-Nation Simulation can be found in Harold Guetzkow, "A Use of Simulation in the Study of Inter-Nation Relations," *Behavioral Science*, 4 (July 1959), 183–191; and in Harold Guetzkow, Chadwick F. Alger, Richard A. Brody, Robert C. Noel, and Richard C. Snyder, *Simulation in International Relations* (Englewood Cliffs, N.J.: Prentice-Hall, 1963).

Nations in the simulation are not intended to correspond to any particular country that existed in the past or exists in the present. Accordingly, the participants do not assume identifiable offices, such as the Prime Minister of England or the Premier of the Soviet Union. Both the roles and the nations are abstractions that represent generalized properties, rather than replications that attempt to portray the details of a specific individual or political system. In a similar fashion, the crises introduced are hypothetical situations containing the designated crisis characteristics rather than representations of historical events.

The Inter-Nation Simulation operates in cycles or periods each sixty to seventy minutes long. In every period at least one exchange occurs between the machine and the human elements of the model. This exchange begins when the decision makers allocate the original resources of their nation in an effort to achieve their selected objectives. To remain in office, every government must successfully pursue at least one objective. Unless the national elites (military juntas, political parties, or other politically active sectors of society) are satisfied by the actions of the decision makers, the calculated programs will eventually indicate that these groups have established a new government. The elites or "validators" are symbolically represented in the programmed calculations. Their level of satisfaction with the government, reported each period to the decision makers, depends primarily on the amount of consumers' goods allocated to them and the relative military standing of their nation.

Nations have four kinds of resources: (1) *basic capabilities* represent the natural, human, and industrial resources of a nation required for the production of the other three kinds of resources as well as additional basic capabilities; (2) *consumption satisfaction* units portray the totality of goods and services available to the populace and reflect the nation's standard of living; (3) *nuclear force capabilities* symbolize nuclear weapon systems; and (4) *conventional force capabilities* constitute all non-nuclear military components. Allocations of these resources to remain in office, as well as for other policies, may involve internal development and a variety of interactions with other nations (for example, trades, alliances, wars).

Once each period, every nation summarizes the decisions they have made on a form submitted to the simulation's calculation staff. On the basis of the programmed assumptions, the consequences of a nation's decisions are computed (1) to determine whether the government continues in office, and (2) to fix the amount of resources (net gain or loss) now available to the decision makers. The results of these calculations are returned to the nation, and the cycle is repeated as the participants engage in a new round of interactions and decisions. A modification of this general simulation model provided the method for studying crisis.

Simulation of Crises

The crisis project involved ten replications or separate "worlds" of the Inter-Nation Simulation conducted at the Great Lakes Naval Training Center. Petty Officers in the United States Navy served as the simulation decision makers. The thirty men in each run were assigned one of five roles in any of six nations. Within each nation the experimenters appointed one individual as head of government, or Central Decision Maker (CDM), with ultimate authority for all governmental policies. Three other men assumed roles in the government as

subordinates responsible to the CDM. The Internal Decision Maker (IDM) handled budgetary allocations; the External Decision Maker (EDM) conducted most foreign affairs; and the Force Decision Maker (FDM) controlled military matters. The occupant of a fifth role in the nation, the Aspiring Decision Maker (ADM), was not a member of the government. As the representative of rival elites within the country, the ADM attempted to replace the CDM as head of state.

The basic Inter-Nation Simulation model contains some organizational characteristics. The representation of organizational features required special attention, however, because the present research focused on the internal process by which nations handled foreign policy crises. To more fully incorporate organizational properties in the simulation, each nation contained (1) a detailed specification of roles, (2) an increase in bureaucratic complexity resulting from the construction of subgroups and mediated communication, and (3) an extended hierarchy of authority.[9]

Each of the six simulated nations operated by Navy men received a series of experimentally introduced situations. The situations varied in the amount of threat, time, and anticipation they offered the participants. Every effort was made to present each situation similarly through all ten runs in order that they might be treated as replications of one another.[10] To increase the comparability of the crises in each of the ten runs, a group of staff members posed as participants and initiated all the experimental situations. A ploy, to the effect that an insufficient number of men had appeared to participate, was used to explain the involvement of non-Navy personnel. Every situation was introduced as a prepared message from one of these confederates. The messages remained identical in all runs. The distinction between actor and observer perspectives arises with the question: Who determined the amount of threat, time, and surprise contained in the situation created by an experimental message?

ACTOR AND OBSERVER MEASUREMENTS OF CRISIS

Measures by Experimenters

The analysis involved two alternative measures of the dimensions of crisis to ascertain what differences exist between the actor and observer perspectives. For the observer measures, the experimenters[11] determined the amount of threat, time, and surprise contained in each specially induced message. They rated the threat present in each situation as high, moderate, or low according to four

9. For a review of the organizational literature on these properties and a fuller description of their incorporation in the Inter-Nation Simulation, see Charles F. Hermann, *Crises in Foreign Policy*, pp. 45–54.

10. A preliminary two-way analysis of variance using "nation" and "run" as independent variables was performed with each of the dependent variables reported in this study. Between runs a significant difference ($p \leq .05$) resulted with only one of the five variables (external communication). The analysis of differences between nations proved significant for three dependent variables and, therefore, the present research includes nation as one of the examined variables. With regard to replication, however, the important finding is the absence of any significant variation between the runs on four of the five variables.

11. In addition to the author, the experimenters in the project were James A. Robinson and Margaret G. Hermann.

criteria: (1) Was it likely that the source proposing the threat could execute it without external assistance? (2) If carried out, would the threat have blocked all means of reaching the goal? (3) Was the threat accompanied by some action, that is, physical commitment as opposed to merely a verbal warning? (4) If carried out, would the threat have involved violence, that is, military action? These criteria include elements of the nature of threat as mentioned by a number of writers.[12] When the experimenters agreed that the four questions representing the criteria could be answered affirmatively, then the situation involved high threat. Low threat resulted when none or only one of the criteria received affirmative ratings. If the experimenters gave positive ratings to two or three of the criteria, a moderate threat classification was assigned to the situation.

For any threat to be effective, it must obstruct some objective that motivates an individual or group. Therefore, the simulated nations had to be assigned goals and the participants had to be motivated to obtain them before the occurrence of an obstructing act would create a threat. Each of the six nations received three goals. Both positive and negative incentives were incorporated into the simulation to encourage goal achievement. A participants' manual, distributed several days before the exercise, stressed the importance of working toward the assigned goals to excel as a decision maker. Also before the simulation, the participants selected those goals they regarded as most important and received positions in a government having these goals. Calculations regularly estimated each nation's goal progress. Governments that advanced toward any given goal received a bonus in basic capabilities during the following period. In addition, they obtained an increase in their validator satisfaction scale indicating the pleasure of their elites with the progress. Nations experiencing a move away from any goal suffered a loss in validator satisfaction, thus increasing the probability that the existing government would lose office.

To measure the amount of decision time, the experimenters specified that all situations would be significantly altered after the lapse of either fifteen or fifty minutes. Those messages permitting fifteen minutes for response by the participants were designated short decision time situations, whereas those which changed after fifty minutes represented extended decision time situations. The experimenters based their judgment for estimating decision time on previous experience with the time required to make important decisions in the simulation. The fifteen minutes allocated for decision time attempted to rush the participants without physically preventing certain minimal activity that might be coded by observers as dependent variables.

The third component of crisis—surprise—occurred when the experimenters provided the participants with no advance warning of a situation that was subsequently thrust upon them. As indicated earlier, the confederates created an experimental situation at a given time by addressing a message to the target nation. In those cases to be defined as anticipated (i.e., nonsurprise), one of the confederates provided an indication of the event about to happen approximately thirty minutes in advance. These anticipative notices consisted of rumors

12. For discussions of threat that influenced the construction of these criteria, see Arthur Gladstone, "Threat and Responses to Threats," *Bulletin of Research Exchanged to Prevent War*, 3 (1955), 23–31; Thomas C. Schelling, *The Strategy of Conflict* (Cambridge: Harvard University Press, 1960); and Stephen B. Withey, "Reaction to Uncertain Threat," in George W. Baker and Dwight W. Chapman, eds., *Man and Society in Disaster* (New York: Basic Books, 1962), pp. 93–123.

reported by the newspaper or vague references communicated by one of the confederate nations. In each instance the advance notice suggested the general behavior that might occur, but it did not provide details. Interventions designated as surprises appeared without warning.

If each simulated nation had experienced the entire set of situations possible by combining the different levels of threat, time, and surprise, the nation's decision makers would have received twelve experimental interventions ($3 \times 2 \times 2 = 12$). The time available for the simulation did not permit such an elaborate design. Instead, each of the six nations led by Navy personnel experienced situations involving all three levels of threat (high, moderate, and low) and both short and extended decision time. In the even-numbered runs, half of the experimental situations directed at a given nation appeared as surprises. The three other situations (to be anticipated) occurred after an advance warning. The odd-numbered runs interchanged anticipated situations with those previously introduced as surprises. By combining the situations experienced in two runs, each of the six nations encountered the following set of situations:

Odd-Numbered Runs	Even-Numbered Runs
surprise/high threat/short time (crisis)	anticipated/high threat/ short time
anticipated/moderate threat/ short time	surprise/moderate threat/ short time
surprise/low threat/short time	anticipated/low threat/short time
anticipated/high threat/ extended time	surprise/high threat/extended time
surprise/moderate threat/extended time	anticipated/moderate threat/ extended time
anticipated/low threat/extended time	surprise/low threat/extended time

When some values of a variable or factor (in this case, surprise) occur in only one level of another factor (in this case, every other run), the two variables are said to be "nested." Described in statistical parlance, this experimental arrangement becomes a nested-factorial design.[13] For ease of comprehension, the list given above presents the situations in the same order for both odd- and even-numbered runs. In the actual simulation experiment, a randomizing process (an incomplete Latin Square) determined the order in which the situations occurred, thus ensuring that the sequence in which the situations appeared was different in each of the ten runs. Among other benefits, this procedure prevented an "experience effect" from being an important element in the overall results. Any pattern of decision that emerges from the accumulated findings of all the runs cannot be attributed to the constant appearance of the crisis situation at the end of the simulation after the decision makers have gained considerable experience; nor can the pattern be explained as a function of the early appearance of crisis in every run. The ten runs involved a total of 360 experimental situations with each nation receiving six induced situations in every run.

Using the experimenters' estimate of the crisis dimensions affords certain advantages. First, the efficiency and control of the experiment can be improved

13. B. J. Winer, *Statistical Principles In Experimental Design* (New York: McGraw-Hill, 1962), p. 184.

substantially because the experimenters' ratings can be obtained in advance of the simulation. We can be assured that each nation will receive every type of situation required by the design and these events will occur in the predetermined order. Second, and equally important, a participant may not be fully conscious of the relative degree of threat, time, or surprise present in a situation with which he is coping. Although his behavior may be affected by these elements, the participant may be unable to supply a reliable report.[14]

Measures by Participants

Whatever the merits of defining crisis from the perspective of the observer, strong arguments can also be made for the actors' perspective. If one chooses the decision-making approach, as we have done in this study, then the actors' perspective becomes extremely important. "What matters in policy-making," the Sprouts assert, "is how the milieu appears to the policy-maker, not how it appears to some sideline analyst or how it might appear to a hypothetical omniscient observer."[15] No situation, no matter how grave or foreboding, will influence a decision maker unless he perceives it. For this reason the participants —the actors in the simulation—provided measures of each crisis characteristic. Immediately after the deadline for responding to an experimental situation, the participants completed a questionnaire. This instrument included scales asking the decision makers to rate the amount of threat, decision time, and surprise that they had experienced. The mean scores of the participants in a simulated nation furnished a composite estimate of each crisis dimension for every experimental situation.

Using the participants' estimates of the amount of each of the three crisis characteristics, samples were drawn from the 360 experimental situations. The crisis sample consisted of the twenty-four situations the decision makers perceived to have had the highest threat, the shortest decision time, and the greatest surprise of all those introduced in the ten simulation runs. A noncrisis sample of equal size contained the situations perceived as involving the least threat, the most time, and the greatest anticipation. Together, the crisis and noncrisis situations constituted a pair of samples. To check the merits of the proposed definition, we also drew six other paired samples. These additional samples controlled for one or two of the crisis traits. For example, to control for threat, the experimenters divided all 360 experimental situations into equal thirds according to the amount of threat perceived by each of the participants. We drew eight cases from the third of the distribution containing the highest threat situa-

14. In a series of interviews conducted by the author, a number of former officials with high-level responsibilities for American foreign policy described several crises in which they had been intimately involved. At the end of the interview, each person rated on a ten-point scale the degree of threat, time, and surprise present in the situation he had discussed. On several occasions the respondent located his problem at one extreme of the scale. When reminded of another problem even more extreme—say, in restricted decision time—he would agree that his own situation had not been as severe as his rating implied. More than once, the individual went on to observe that when he experienced the problem, decision time looked as limited as he could imagine.

15. Harold Sprout and Margaret Sprout, "Environmental Factors in the Study of International Politics," in James N. Rosenau, ed., *International Politics and Foreign Policy* (New York: The Free Press, 1961), p. 113.

tions. An equal number were drawn from the middle and bottom thirds of the threat distribution. Thus the twenty-four situations in this sample ranged over the entire distribution with respect to the controlled dimension of threat, but these situations were selected only if they also contained extreme values for the uncontrolled dimensions (for example, extended time and surprise). We chose the following six additional paired samples in this manner:

high vs. low threat (time and surprise controlled)
short vs. extended time (threat and surprise controlled)
surprise vs. anticipation (threat and time controlled)
high threat–short time vs. low threat–extended time (surprise controlled)
high threat–surprise vs. low threat–anticipation (time controlled)
short time–surprise vs. extended time–anticipation (threat controlled)

Let us review the reason for these additional six paired samples that involve the control of one or two dimensions. Recall the macro hypothesis of this research states that when a situation contains high threat, short time, and surprise (that is, a crisis), the decision processes will be different from those in situations with none, one, or two of these characteristics. An investigation of the validity of this proposition requires that we compare the decision processes in crisis with the processes in situations having less than the full contingent of crisis traits. For the actors' measurement of crisis characteristics, these less-than-crisis situations appear as the controlled paired samples. With the experimenter ratings of the crisis characteristics, we can determine the influence of one or two dimensions alone through the use of analysis of variance, thus eliminating the need for situations that have some controlled characteristics.

In general, the participants' ratings of the crisis traits agreed with those of the experimenters. A *t*-test based on the data from all runs established a significant difference in the degree of surprise perceived by the participants between situations the experimenters classified as surprise and those they classified as anticipated ($p = .04$). The participants' ratings revealed a similar difference between the experimenters' definitions of short and extended time ($p = .007$). An analysis of variance on the levels of threat indicated that the participants perceived a significant difference between the three levels defined by the experimenters ($p = .001$). Tests on the individual components of variance confirmed significant differences between high and moderate threat ($p = .01$) and high and low threat ($p = .01$), but not between moderate and low threat. These tests indicate that the participants could distinguish between the categories devised by the experimenters. Whether the perspectives correspond sufficiently to identify situations that have similar decision processes remains to be determined.

EFFECTS OF CRISIS ON DECISION PROCESSES

This section reports the effects of crisis and other situations on five selected decision processes: authority structure, alternative proposals, internal communication, external communication, and frequency of action. An investigation of these working or micro hypotheses furthers the three major concerns of this chapter. First, the composite results provide an initial check on the theoretical and empirical utility of the proposed definition of crisis by furnishing evidence on the macro hypothesis of the study. Specifically, the effects of crisis on each decision process can be compared with those of situations having less than the

three specified characteristics. Second, actual international crises supply some evidence for the validity of the five selected propositions. Therefore, the degree of consistency between findings from "real world" crises and those generated in the simulation offer insight into the applicability of simulation for crisis research. Third, some consequences of using the actor rather than the observer definition of the situation result by interchanging in every hypothesis the experimenter and participant ratings of the situation. Although the findings on the five working hypotheses may be of some intrinsic interest, they function primarily as means to these three objectives.

Contraction of Authority

> In crises the number of decision makers assuming a major role in the decision will be reduced; that is, there will be a contraction in the number of individuals exercising authority.

Both the 1962 Cuban missile crisis and the 1950 decision to intervene in Korea support this hypothesis. Instead of using the complex organizational machinery designed for handling foreign affairs, both Presidents made their decisions with the aid of approximately a dozen advisers. Other crises also illustrate the contraction of authority.[16] To estimate the number of participants active in a given decision, each person indicated on a questionnaire, administered immediately after the deadline for responding to an experimental situation, whether he had written or talked with his associates about the problem. The number of individuals in a nation who claimed that they participated constituted an indicator of involvement. Decision makers completed the questionnaire periodically throughout the simulation under the guise of providing material for a history of the simulated world.

As with the other four hypotheses, a four-way analysis of variance served as the method to interpret data involving the experimenter ratings of the crisis characteristics. The statistical procedure allowed us to determine the effect on participation of four independent variables—surprise, threat, time, and nation. The impact of each variable was calculated separately and in various combinations. In other words, the analysis of variance permitted us to identify the main effect of each of these variables independently of the other three. In addition, we examined the interaction effect of the variables taken two, three, or four at a time. Interactions determine whether some systematic effects are attributable not to a single independent variable, but to a particular combination of two or more independent variables. With interactions, the question asked is: Are there unique effects resulting from the combination of variables? We were particularly interested in interactions among threat, time, and surprise because that combination constitutes the measure of crisis. The main effects and interactions provided information similar to that we obtained by creating six additional paired samples with the participants' ratings. The analysis of variance also gives information on the effect of the nation variable—data unavailable from the participants' ratings.

To confirm the hypothesis with data from the observer perspective, the interaction of threat, time, and surprise should produce a significant downward

16. Additional examples are discussed in Charles F. Hermann, "Some Consequences of Crisis Which Limit the Viability of Organizations," *Administrative Science Quarterly*, 8 (June 1963), 70.

change in the amount of participation. No such relationship occurred. However, relationships between the level of participation and several other kinds of situations occurred with a far greater frequency than one would expect by chance alone ($p \leq .05$). Situations having only one or the other of two crisis traits—threat or time—yielded significant main effects. As threat increased, the number of participants increased. This finding reversed the direction of the initial hypothesis. On the other hand, the relationship involving time ran in the predicted direction. As time decreased, the number of participants decreased. The amount of participation also varied from nation to nation, with larger nations tending to have fewer decision makers engaged in all situations. All but two of the possible interactions involving the nation variable significantly affected the amount of participation. The various interactions of nation with the situational characteristics require further investigation, but this task is beyond the bounds of a paper focused on the three assumed attributes of crisis. A summary of the analysis of variance results for contraction of authority appears in the first column of Table 1.

TABLE 1. CONTRACTION OF AUTHORITY VARIABLE WITH EXPERIMENTER AND PARTICIPANT RATINGS OF THE CRISIS DIMENSIONS

	Analysis of Variance (Experimenter Ratings) *F Values*	*Chi Square (Participant Ratings)* X^2 *Values*
Crisis (threat × time × surprise)	0.74	2.22*
Threat	17.00***	0.08
Time	6.08**	0.36
Surprise	2.46	0.78
Nation	7.36***	—
Threat × time	1.94	0.58
Threat × surprise	2.21	0.08
Threat × nation	3.14***	—
Time × surprise	1.81	0.44
Time × nation	3.31***	—
Surprise × nation	2.79**	—
Threat × time × nation	3.40**	—
Threat × surprise × nation	1.93**	—
Surprise × time × nation	1.61	—
Threat × time × surprise × nation	0.71	—

* $p \leq .10$.
** $p \leq .05$.
*** $p \leq .01$.
NOTE: F and X^2 values cannot be compared directly

To explore the same hypothesis with crisis defined by the participants' ratings, the situations in each sample were assigned to one of two categories. If four or more of the decision makers indicated they had participated in the decision, that situation then received a "noncontraction" designation. The other category, "contraction," consisted of situations involving less than four participants. Chi squares determined if the number of contractions differed between crisis-noncrisis and the other paired samples. Table 1 displays the results int w

second column. (Notice that because the nation variable was not possible in this analysis, rows of the table concerned with that variable remain blank.) For crisis-noncrisis, the results run counter to the hypothesis. Crisis decisions engaged more individuals than noncrisis decisions. Using the participants' ratings, no one or two of the crisis traits identify situations that alter the amount of participation. In short, although the actor and observer perspectives lead to different results, neither supports the contraction-of-authority hypothesis.

Number of Alternatives

In crises the number of alternative solutions to the situation that will be identified by the national decision makers will be reduced.

Based on the Cuban missile crisis, the Wohlstetters and Schelling suggest that the number of alternatives increase in crisis.[17] We postulate the opposite relationship in this research, however, on the basis of a somewhat broader range of evidence. For example, a content analysis of diplomatic messages exchanged prior to the outbreak of World War I supports the proposition that "as stress increases decision makers will perceive the range of alternatives open to themselves to become narrower."[18] In addition, a study of the decision to intervene in Korea confirms the proposition and a substantial number of psychological studies conclude that severe stress reduces alternatives.[19]

A content analysis of all messages and conference transcripts determined the number of distinctive alternatives considered by the participants in each different type of experimental situation. The frequency count obtained from that analysis served as the basis for a proportion consisting of the number of alternatives advanced in a standard unit of time. This proportion controlled for the potential fluency differences between short and extended time. After a period of training, coders attained a high degree of reliability in identifying when decision makers advanced new alternatives.[20]

The first column of Table 2 summarizes the findings for the linkage between the number of alternatives and the experimenters' ratings of situations. The interaction of threat, time, and surprise with the number of alternatives produces no statistically significant relationship. Thus, from the observers' perspective, the hypothesis between crisis and alternatives fails to receive confirmation. Separately, however, two of the three components of crisis constitute situations that significantly affect the number of alternatives. As time increases, fewer alternatives are considered; as threat increases, more alternatives are considered. In addition, two significant interactions occur among the three crisis variables. One

17. Albert Wohlstetter and Roberta Wohlstetter, *Controlling the Risks in Cuba*, Adelphi Paper No. 17, Institute for Strategic Studies (London), April 1965, p. 18; Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966), p. 96.

18. Ole R. Holsti, "The 1914 Case," *American Political Science Review*, 59 (June 1965), 365.

19. Richard C. Snyder and Glenn D. Paige, "The United States Decision to Resist Aggression in Korea," *Administrative Science Quarterly*, 3 (December 1958), 362. For a review of psychological studies on this point see Richard S. Lazarus, *Psychological Stress and the Coping Process* (New York: McGraw-Hill, 1966).

20. Intercoder reliabilities for the content analysis of alternative proposals was .93 using a Pearson product moment correlation.

TABLE 2. NUMBER OF ALTERNATIVES VARIABLE WITH EXPERIMENTER AND PARTICIPANT RATINGS OF THE CRISIS DIMENSIONS

	Analysis of Variance (Experimenter Ratings) F Values	*Mann-Whitney U (Participant Ratings) Normalized U's*
Crisis (threat × time × surprise)	0.87	0.74
Threat	37.37***	0.02
Time	13.58***	0.88
Surprise	0.48	0.94
Nation	4.52***	—
Threat × time	6.49***	2.95***
Threat × surprise	0.06	1.19
Threat × nation	1.43	—
Time × surprise	4.69**	0.24
Time × nation	8.20***	—
Surprise × nation	2.56**	—
Threat × time × nation	1.95**	—
Threat × surprise × nation	1.38	—
Surprise × time × nation	0.91	—
Threat × time × surprise × nation	0.84	—

* $p \leq .10$.
** $p \leq .05$.
*** $p \leq .01$.
NOTE: F and U values cannot be compared directly.

is between threat and time; the other is between surprise and time. As indicated in Figure 1, when threat remains minimal, the amount of available time makes little difference in the number of alternatives discussed. As threat increases, decision time becomes steadily more important in determining how many alternatives will be considered. Under high threat in the simulation, a very limited amount of time encourages relatively more attention to enumerating alternatives than if time is extended. At the upper levels of threat, if participants possess more time, they use it for some other aspects of the decision process than generating alternatives. Another explanation might be that under high threat and limited time, participants become too pressured to discriminate between alternatives. Thus they mention courses of action which they would otherwise privately reject.

Figure 2 shows a reversal in the effect of anticipation on the number of alternatives depending upon the amount of time available for decision. When considerable decision time exists, the participants enumerate slightly more alternative proposals in situations that occur as a surprise than in situations that emerge after a warning. Under conditions of short decision time, however, an anticipated situation leads to more alternative proposals. Participants, who receive a warning of a forthcoming situation involving no urgency (i.e., extended time), may postpone consideration of the problem including the identification of solutions. On the other hand, should a fast decision be required, anticipation provides more precious time to consider alternative solutions. As displayed in the first column of Table 2, a significant main effect also results with the nation variable. Significant interactions occur between nation and anticipation as well

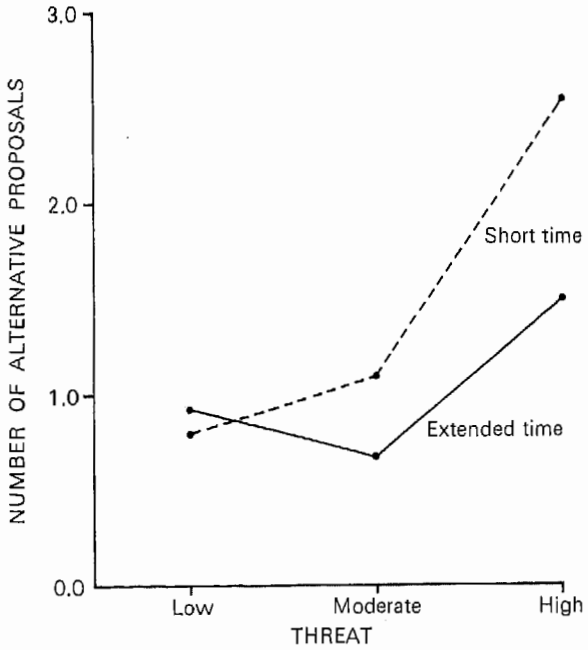

FIGURE 1. Number of alternative proposals per unit of time in six situations with different combinations of threat and time.

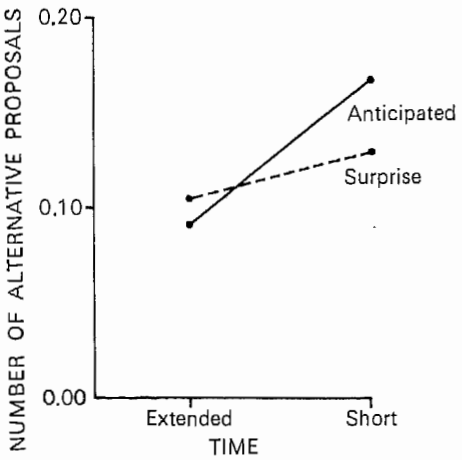

FIGURE 2. Number of alternative proposals per unit of time in four situations with different combinations of surprise and time.

as between nation and time. Three variables (nation, threat, and time) constitute a significant three-way interaction with the dependent variable, number of alternatives.

In moving from the experimenter to the participant measures of crisis, we shift from analysis of variance to the use of Mann-Whitney *U*'s. With this

statistic, the researcher arranges situations in order according to rank with that situation having the most alternatives assigned the first rank; the situation with the next largest number of alternatives receives the second rank, and so on. The more situations from one sample which rank ahead of those from the other, the smaller the U and the greater the assumed difference between the categories represented by the two samples. (However, after converting U's to z scores to correct for tied ranks, the larger the resulting normalized U, the greater the difference between samples.) To examine data on the remaining hypotheses from the actor perspective, this statistic will compare each set of paired samples. As shown in the second column of Table 2, the data fail to support the present hypothesis that crisis reduces alternatives. The one significant difference reveals that situations perceived by the participants as high threat and short time result in more alternatives than occur in low threat–extended time situations. This result conforms to the finding obtained from the observer perspective.

Internal Communication

In crises the rate of communication within the foreign policy agencies of a nation will increase.

Statements of policy makers with experience managing crises support this hypothesis on increased communication within a government (internal communication). For example, a high-ranking member of the United States embassy in Beirut during the Lebanon crisis of 1958 related: "In a normal month the code room handled between 100,000 and 150,000 words but after the rebellion broke out the traffic quintupled to 700,000 words."[21]

Additional evidence comes from a study of the cable traffic between the Department of State and its Latin American embassies and consulates during the Cuban missile crisis.[22] That research shows a remarkable increase in communication even though officials urged that telegraphic communications during the crisis be confined to critical messages. In the simulation internal communication consisted of the number of sentences (both written and oral) exchanged between members of the same simulated nation. The total volume of communication in any situation was divided by the duration of that event to establish a rate of communication per minute.

The analysis of variance of crisis traits, as defined by the experimenters, yielded four significant interactions between various combinations of the independent variables and the volume of internal communication. Again, the critical threat/time/surprise interaction was not among them. All four significant findings, shown in Table 3, included the nation as one of the interacting variables. The recurrent combination between nation and one or more of the crisis traits suggests that national characteristics together with situational characteristics interact in some way to create different kinds of decision processes. The first column in Table 3 reveals that only time, among the separate components of crisis, significantly altered the rate of internal communication independent of the

21. Charles W. Thayer, *Diplomat* (New York: Harper & Row, 1959), p. 21.

22. William A. Runge, *Analysis of the Department of State Communications Traffic During a Politico-Military Crisis*, Research Memorandum OAD RM 109, Stanford Research Institute, Menlo Park, Calif., 1963.

TABLE 3. INTERNAL COMMUNICATION VARIABLE WITH EXPERIMENTER AND PARTICIPANT RATINGS OF THE CRISIS DIMENSIONS

	Analysis of Variance (Experimenter Ratings) F Values	*Mann-Whitney U (Participant Ratings) Normalized U's*
Crisis (threat × time × surprise)	1.18	2.52***
Threat	0.16	0.96
Time	9.90***	1.27*
Surprise	0.07	1.79**
Nation	1.48	—
Threat × time	1.38	3.09***
Threat × surprise	0.44	1.08
Threat × nation	3.00***	—
Time × surprise	0.33	0.49
Time × nation	3.56***	—
Surprise × nation	0.53	—
Threat × time × nation	4.31***	—
Threat × surprise × nation	1.13	—
Surprise × time × nation	0.20	—
Threat × time × surprise × nation	1.80*	—

* $p \leq .10$.
** $p \leq .05$.
*** $p \leq .01$.
NOTE: F and U values cannot be compared directly.

effects of nation. The rate of communication in short time situations exceeded that in extended time situations.

In contrast to the results with the experimenters' ratings, internal communication increased in crisis when the component traits of crisis were rated by the participants. As indicated in the second column of Table 3, significantly more internal communication occurred in crisis than in noncrisis. The table also shows that several of the traits, separately and in combination, produced significant effects on communication. The rate of communication in short time situations surpassed that in extended time situations. Furthermore, anticipated situations yielded more communication than those characterized by surprise. High threat–short time situations involved more internal communication than their opposite (low threat–extended time). The threat by time interaction for the experimenter ratings was not significant; but when "nation" was added to those two variables, the interaction was significant. The relationships concerning time alone and threat-time are the only ones relevant to internal communication in which the actor and observer viewpoints produced somewhat parallel findings.

External Communication

In crises, the rate of communication by a nation's decision makers to international actors outside their country will increase.

This hypothesis is a companion of the previous one; they differ as to the party to whom messages are addressed. The 1914 crisis before the outbreak of

war illustrates this proposition. "As the crisis developed, decision makers in various capitals received rapidly increasing volumes of messages from various parts of Europe."[23] To study this relationship in the simulation, the experimenters followed a procedure similar to that used in the internal communication hypothesis. They examined all written messages and conference transcripts addressed to individuals outside the sender's nation and counted the number of sentences. Again, rates of communication were established by dividing the total number of sentences communicated during a situation by the length in minutes of that event.

The results of the analysis of variance using the experimenters' ratings of crisis appear in the first column of Table 4. The five statistically significant relationships with external communication exclude the predicted crisis interaction. Nation and time yield significant main effects—that is, they both independently affect the rate of external communications. Regardless of the kind of

TABLE 4. EXTERNAL COMMUNICATION WITH EXPERIMENTER AND PARTICIPANT RATINGS OF THE CRISIS DIMENSIONS

	Analysis of Variance (Experimenter Ratings) F Values	*Mann-Whitney U (Participant Ratings) Normalized U's*
Crisis (threat × time × surprise)	0.60	1.32*
Threat	0.91	1.39*
Time	24.38***	0.76
Surprise	0.10	0.28
Nation	3.34***	—
Threat × time	6.14***	1.47*
Threat × surprise	0.92	0.72
Threat × nation	0.72	—
Time × surprise	0.01	1.73**
Time × nation	4.15***	—
Surprise × nation	0.24	—
Threat × time × nation	2.40***	—
Threat × surprise × nation	0.30	—
Surprise × time × nation	0.18	—
Threat × time × surprise × nation	0.89	—

* $p \leq .10$.
** $p \leq .05$.
*** $p \leq .01$
NOTE: F and U values cannot be compared directly.

situation, nations with large amounts of resources tend to engage in more external communication than small nations. Moreover, as decision time decreases, the rate of external communication increases. Among the significant interactions, two involve the nation variable (nation/threat; nation/threat/time). The third interaction, diagrammed in Figure 3, combines the crisis traits of threat and time. The diagram indicates that the less severe the threat, the greater

23. Robert C. North, "Propositions from the 1914 Crisis," in Robert C. North, Ole R. Holsti, M. George Zaninovich, and Dina A. Zinnes, *Content Analysis* (Evanston, Ill.: Northwestern University Press, 1963), p. 164.

the importance of decision time in determining the rate of communication. Although in short time situations the rate of communication always surpasses the rate in extended time situations, the variation in time changes the amount of communication much more in the low-threat condition than in either the moderate- or high-threat condition. It may be that as threat increases, in short time situations the decision makers conclude that other tasks have priority over interacting with international actors.

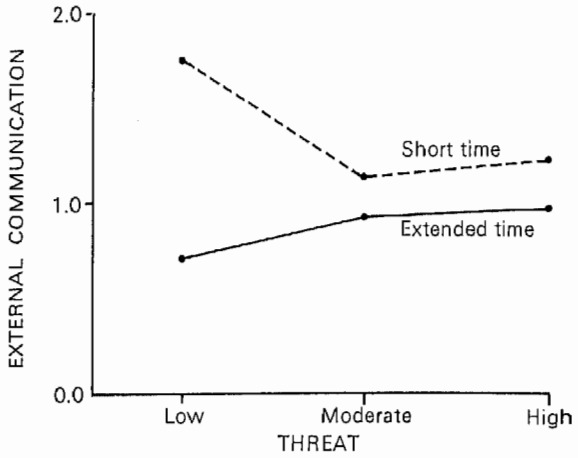

FIGURE 3. Rate of external communication per unit of time in six situations with different combinations of threat and time.

Unlike the results with the experimenter measure of crisis, the participants' ratings of the three characteristics support the hypothesis ($p \leq .10$) that crises influence external communication. (See the second column of Table 4.) Simulation decision makers communicated with actors outside their nation more frequently in crisis than noncrisis. When the threat characteristic is isolated, low threat produced more communication than high threat. In a finding similar to the threat by time interaction found with the experimenters' ratings, high threat–short time situations as perceived by the participants involved more external communication than did low threat–extended time situations. The combination of short time with surprise also led to more external communication than did situations with the opposite characteristics.

Frequency of Action

In crises the frequency with which a nation's decision makers are likely to take action in response to the situation increases.

The American government undertook strong actions in both the 1950 Korean and the 1962 Cuban crises. The need for action which decision makers experience in a crisis receives documentation in the description of specific events —such as the 1914 crisis—and more general characterizations of crisis.[24] Action

24. For an account of the felt need for action in the 1914 crisis, see Robert C. North, "Perceptions and Action in the 1914 Crisis," *Journal of International Affairs*,

in the simulation consisted of any forms completed in response to a situation that allocated or deployed part of the nation's resources (for example, trades, blockades, military attacks, defense spending) or any external communication that indicated what the nation had done or would do about the situation. The total number of such activities constituted the frequency of action for each experimental situation.

Using the experimenters' ratings, more statistically significant relationships appeared between the various situational variables and the frequency of action than with any of the previous four dependent variables. Nevertheless, as displayed in the first column of Table 5, situations formed by the interaction of the

TABLE 5. FREQUENCY OF ACTION VARIABLE WITH EXPERIMENTER AND PARTICIPANT RATINGS OF THE CRISIS DIMENSIONS

	Analysis of Variance (Experimenter Ratings) F Values	*Mann-Whitney U (Participant Ratings) Normalized U's*
Crisis (threat × time × surprise)	0.14	1.80**
Threat	31.70***	0.35
Time	33.50***	1.67**
Surprise	0.00	1.93**
Nation	2.84**	—
Threat × time	4.75***	2.71***
Threat × surprise	0.19	1.33*
Threat × nation	4.15***	—
Time × surprise	0.05	1.72**
Time × nation	4.83***	—
Surprise × nation	1.14	—
Threat × time × nation	4.98***	—
Threat × surprise × nation	2.04**	—
Surprise × time × nation	0.42	—
Threat × time × surprise × nation	2.58***	—

* $p \leq .10$.
** $p \leq .05$.
*** $p \leq .01$.
NOTE: F and U values cannot be compared directly.

three crisis traits produced no significant increase in action. By contrast, threat and time—both as separate main effects and in combination with each other—altered the frequency of action. Taken in isolation, more situational threat increased the frequency of action. The consequence of time as a main effect was also direct; as time decreased, the frequency of action decreased. Figure 4 pictures the interaction of these two crisis components as they relate to action. In both conditions of time, increases in the threat component produced increases in the frequency of action, but the impact of threat in extended time situations exceeded that for short time situations. Moreover, the difference in the number

21 (1967), 103–122. A more general analysis of crises that reaches the same conclusion is Anthony J. Wiener and Herman Kahn, *Crisis and Arms Control*, Hudson Institute, 1962, p. 9.

of actions between the two time conditions became greater as threat increased. In summary, although action increased with threat, that increase took a more gradual course when decision time remained limited.

The first column of Table 5 indicates that once again variations in the nations influenced the value of the dependent variable. As a main effect, differences among nations related to differences in the frequency of action; specifically, the data suggest a slight trend toward more action by nations with more resources. Five significant interactions involving the nation variable appear in Table 5 or, put another way, only two possible combinations with the nation variable remained unrelated to the frequency of action.

As with several previous hypotheses, the substitution of the participants' definition of crisis for that of the experimenters' shifts the results from disconfirming to confirming. When defined by the participants, the combination of high threat, short time, and surprise increases the frequency of action. This

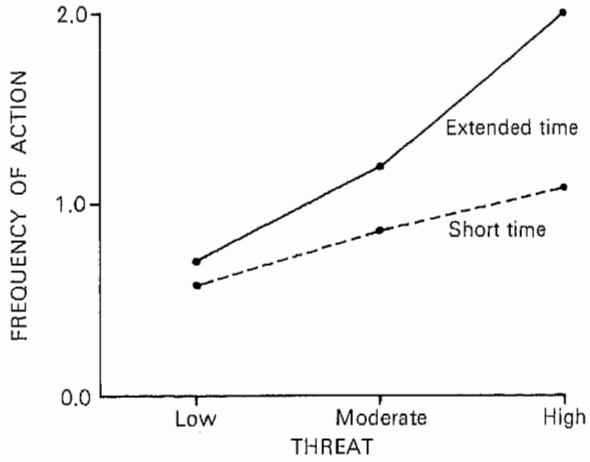

FIGURE 4. Frequency of action in six situations with different combinations of threat and time.

finding and the other results of the *U* tests appear in the second column of Table 5. As can be seen by comparing the pattern of significant results in the two columns of that table, the observer and actor measures of crisis produce similar results with two variables—time, and threat combined with time. More action occurs in situations that the participants perceive as involving short time than in situations they perceive as allowing extended time for decision. More action also follows in high threat–short time situations than in low threat–extended time situations. Three other types of situations, as defined by the participants, influenced action, but remained nonsignificant in the analysis of variance of the experimenters' ratings. The decision makers initiated more actions in situations they characterized as anticipated, low threat–anticipated, and short time–surprise than they did in situations with the opposite characteristics.

CONCLUSIONS

This chapter asked three questions relevant to a substantial portion of the research on crisis. They were (1) Of what empirical and theoretical utility is the concept of crisis when it is defined in terms of high threat, short time, and surprise? (2) Given the proposed definition of crisis, does it make much difference whether the components of crisis are ascertained by the individuals or groups experiencing the crisis rather than by knowledgeable observers? (3) How appropriate is simulation as a research method for the study of international crises? The conclusions address these questions using the results from the five hypotheses examined with simulation data.

Definition of Crisis

Regardless of the specific definition of crisis, it must permit the identification of a class of situations and participate in the development of theoretical assertions which yield empirically verifiable hypotheses. To that end this study involved a macro hypothesis that situations characterized by high threat to important goals, short time for decision, and surprise for the policy makers would increase the probability of certain decision processes not likely to occur in situations lacking one or more of the designated crisis traits. Five working hypotheses relating crisis, as defined, to selected decision processes served as an initial means of exploring the macro hypothesis. If situations characterized by the proposed crisis traits did alter most of the five decision process variables in a way that other situations did not, then these findings would offer initial support for the macro hypothesis. In turn, the substantiation of the macro hypothesis would suggest that the theoretical utility of the proposed definition of crisis warranted more extensive consideration.

Table 6 summarizes the relationships between the various combinations of situational variables and the five process variables that reached a certain confidence level ($p \leq .10$). If one compares the total number of relationships (column 3) in which each situational trait or combination of traits participates, then the proposed definition of crisis fares poorly. With the five process variables, more relationships result from situations distinguished only by the isolated trait of time or by the combination of time and threat than result from the integrated crisis definition. Furthermore, threat alone accounts for as many significant results as does crisis. This assessment of the proposed definition becomes less harsh if the analysis is confined to the participants' ratings of the crisis traits (Table 6, second column). Crisis and threat-time both enter into four of the possible five relationships, whereas no other trait or combination of traits produces more than two.

For a number of reasons, any conclusions drawn from this study must be quite tentative. The research involved an extremely small sample of process variables. The relationships between situation and process variables were explored in only one study by one method. Moreover, the data have been analyzed only for the existence of relationships, not for the strength or degree of relationship. Nevertheless, certain observations seem appropriate. The element of surprise entered into fewer relationships with the process variables than any of the other situational characteristics. Surprise may have been inadequately represented in the experimental situations; that is, the absence of significant results with surprise

TABLE 6. SUMMARY OF RESULTS BETWEEN EITHER EXPERIMENTER OR PARTICIPANT RATINGS OF CRISIS DIMENSIONS AND FIVE DEPENDENT VARIABLES

	Experimenter Ratings (Analysis of Variance)	*Participant Ratings (U or X^2)*	*Total Result with $p \leq .10$*
Crisis		C*, I, E, A	0+4
Threat	C*, N*, A	E*	3+1
Time	C, N*, I, E, A*	I, A	5+2
Surprise		I*, A*	0+2
Threat × time	N*, E, A	N*, I, E, A	3+4
Threat × surprise		A*	0+1
Time × surprise	N*	E, A	1+2
Nation	C, N, E, A		4
Threat × nation	C, I, A		3
Time × nation	C, N, I, E, A		5
Surprise × nation	C, N		2
Threat × time × nation	C, N, I, E, A		5
Threat × surprise × nation	C, A		2
Surprise × time × nation			0
Threat × time × surprise × nation	I, A		2

KEY: C=contraction of authority; N=number of alternatives; I=internal communication; E=external communication; A=action.

NOTE: Underlined letters represent relationships with p values between .10 and .05. An asterisk (*) indicates that the results with crisis or its components are in the reverse direction from that predicted in the hypothesis. For the analysis of variance interactions, conclusions on direction are based on only the two situations that correspond to the paired samples used in the U or X^2 tests. No determination on direction is made for results involving the nation variable.

could be a function of the research design. Alternatively, the situational quality of surprise may be relatively less important in the decision process than either threat or time. Consistent with this interpretation is a review of the crisis literature that found the property of surprise mentioned less frequently than the other two traits.[25] If the latter explanation is correct, then the concept of crisis might be recast to include only high threat and short time—the combination of situational traits that performed well with either the participant or experimenter ratings. The author, however, considers such a reformulation premature without further investigation of the initial definition.[20]

25. Charles F. Hermann, "Some Consequences of Crisis," pp. 63–65.

26. The treatment of surprise differed from that for threat and time in both the experimenter and participant ratings. As noted in this chapter, all combinations of surprise with the other two variables were achieved only by aggregating the results from two consecutive runs. Furthermore, participants, who frequently had more than they could readily manage, may have failed to read the warning messages. With respect to the participants' ratings, the questionnaire format for surprise varied from that used for the other traits and it may have been less effective. Until these possible explanations for the poor performance of surprise are corrected in subsequent experiments, the characteristic should not be discarded.

Actor and Observer Perspectives

The evidence from this study on the actor and observer perspective can be stated briefly. Whether crisis traits were defined by the participants or by the experimenters made a considerable difference in the simulation. The results with the process variables indicate that the two sets of situations defined by either actors or observers have different effects on the procedures for choice-making. Of the twenty-eight results reported in Table 6 (excluding the nation variable), eighteen findings established by one perspective remained unconfirmed by the other. In one of the five relationships substantiated by both the actor and observer perspectives of crisis, the direction of the relationship found with one measure reversed that discovered with the other. (With participant ratings, as contrasted with observer measures, short time involved more action.) Nowhere were the effects of the alternative perspectives more evident than with the proposed definition of crisis (Table 6, first row). None of the hypotheses received support from the experimenters' ratings. By contrast, three of the five hypotheses were confirmed with the participants' ratings of crisis and a fourth relationship was established in the opposite direction from that predicted. Of course, caution must be applied in interpreting these results; other observers might agree more closely with the perspectives of the actors. The alternative methods of analysis rather than the different perspectives could account for the results. Despite these reservations, the simulation findings suggest that the perspective from which crisis is defined—even when the same traits are used—is extremely important in comparing results from different crisis studies.

Appropriateness of Simulation

Some persons question the utility of the simulation-gaming technique for providing any useful insights about international politics. This chapter narrowed the issue to the applicability of the technique for research on a particular subject. No study based on a single type of simulation can offer definitive answers. Vast differences exist between the assets and liabilities of different types of games and simulations. The uses for which one simulation or game may prove valuable provide little evidence about the utility of another type. Nevertheless, the evidence acquired from various games and simulations contributes to the general assessment of the techniques as means of understanding crises.

All five hypotheses relating crisis to decision processes have been derived from studies of actual international crises. Given the present state of knowledge, one or more of the hypotheses may prove false, but initial examination suggests otherwise. If the simulation generated the important qualities of crisis and the context in which they occur, and if the hypotheses described actual conditions in coping with crises, then the simulation should confirm the hypotheses.[27] As previously noted, the data failed to confirm any of the hypotheses

27. This sentence should not be interpreted as an example of the *post hoc, ergo propter hoc* fallacy. The simulation could substantiate the hypotheses through operations that in no way matched those in actual crises. Hence the confirmation of the hypothesis in both the simulation and its referent system remains an incomplete validity check. However, failure to obtain similar results in simulated and actual crises might indicate the inadequacy of the model. For a discussion of this validity problem see Charles F. Hermann, "Validation Problems in Games and Simulations with Special Reference to Models of International Politics," *Behavioral Science*, 12 (May 1967), 216–231.

when the analysis involved the experimenters' ratings of the crisis traits. On the other hand, with the participants' definition of the situations, three of the five hypotheses received support.

The two unconfirmed hypotheses warrant brief examination. Despite considerable evidence that contraction occurs in crises,[28] the simulation findings (using participants' ratings) indicated more contraction in noncrisis than in crisis. For the contraction hypothesis, the representation of foreign policy organizations by five individuals may have proven unsatisfactory. One study of the American decision to assist Korea suggests that "the principal national crisis decision-making group will tend to vary in size from twelve to fifteen officials."[29] Thus, when faced with a crisis, a five-man simulated nation should strain to engage every possible man. This appears to have happened in the simulation with the result that contraction occurred more frequently in noncrises.

The second unconfirmed hypothesis contends that crises lead to the consideration of fewer alternatives. It is noteworthy that the actual crises reviewed for this hypothesis contained some contradictions regarding the number of alternatives. However, the measurement procedures used in the simulation offer another possible explanation for the absence of support for the hypothesis. The simulation involved experimental situations of strikingly different duration (fifteen as opposed to fifty minutes). Obviously, with sufficient restrictions on available time, the decision makers would examine fewer alternatives. To avoid confirming only this rather trite observation, the measure of alternatives was standardized for time by computing the number of alternatives per unit of time. In retrospect, this measure may have created new difficulties because it seems reasonable to suggest that at some point decision makers will elect to spend further increments of time on some other activity than enumeration of alternatives. This explanation is consistent with the data, under conditions of moderate and high threat, diagrammed in Figure 1. Although the absolute number of alternatives may be less in crisis, that type of situation may have a higher proportion of alternatives per minute than situations with extensive amounts of time. In summary, the discrepancies between the simulation data and the evidence on actual crises may be attributable not to the simulation technique, but to shortcomings in this particular experiment.

Although the participants experienced various amounts of threat, time, and surprise in the simulation, the question remains as to whether the values of the variables approached those of equivalent variables during actual international crises. The present study offers little systematic evidence on the problem but, in general, laboratory experiments appear to have more success in creating a wide range of values for some kinds of variables than for others. Using the three proposed components of crisis as an example, the author suspects that substantial variations in the time available for certain simulation decisions was more readily manipulated than either threat or surprise. The greater range of values for time may explain why that variable was the only one manipulated by the experimenters which resulted in changes in all five decision processes. Even though some variables may be subjected to greater variation in a simulation than others, crises in such models undoubtedly create less change in variables like

28. Bernard Berelson and Gary A. Steiner, *Human Behavior* (New York: Harcourt, Brace, & World, 1964), p. 370.

29. Glenn D. Paige, *The Korean Decision* (New York: The Free Press, 1968), p. 286.

affective perceptions than do actual crises. This limitation becomes severe if the variable to be manipulated is curvilinear so that its effects at lower levels cannot be easily projected to higher levels. However, if these difficulties temporarily drive the researcher out of the simulation laboratory, other problems in the study of crisis may encourage him to reenter. A rigorous effort to determine the effects of various situational variables separately and in a wide number of combinations, as undertaken in this analysis, would have been extraordinarily difficult to execute using actual international situations. The study of crisis may best be served by the analysis of both simulation and real world situations.

Nation as a Variable

In addition to the three questions that formed the core of this chapter, some concluding remarks must be addressed to the influence of the nation variable. As shown in the eighth row of Table 6, differences between nations resulted in changes in four of the five decision process variables. Of equal interest are the twenty-two relationships between process variables and some combination of situational traits and the nation variable. What differences among the six simulation nations might account for these relationships? Because each of the six nations was replicated ten times with different participants in each run, certain elements such as personality traits or organizational arrangements seem unlikely to explain the discrepancies. Across all ten runs, a given nation always began with the same number of resources, but no two nations within a run had the same capabilities. Thus differences in the amount of national resources could account for the effect on decision processes. Other possible attributes which differed from nation to nation throughout all the replications included alliance membership, national goals, and status in the international system. Whether one or a combination of these qualities, or some others, constitute the important difference between nations cannot be established with these data. Students of international policies would expect that different nations would use different decision processes. The significance of the present study lies in the recurrent influence of the interaction between the situation and the nation on decision processes.