

# AN INVENTORY AND ANALYSIS OF THE WORLD POLITICS SIMULATION PROPOSITIONS

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## Introduction

The purpose of this essay is to itemize and to analyze the essential assumptions of World Politics Simulation (WPS)—developed primarily, but not entirely, by William D. Coplin at Wayne State University.<sup>1</sup> The concern here is not upon the methodological basis of simulation; rather, it is the substantive propositions about international relations. This is a verbal statement of the WPS international relations theory.

Although the primary and immediate object here is to verbalize WPS, questions concerning the utility and validity of simulation as a theory-building technique will be raised. Some partisans of the simulation approach contend that theory expressed through the medium of simulation is characteristically elegant and precise. These attributes are a function of the "operating" quality of simulation models. Models that "operate" purportedly require a small number of variables with considerable explanatory power and precisely defined relationships between the variables.<sup>2</sup> It is also held that simulations provide the opportunity to discover poorly developed areas in theoretical knowledge, and the occasion for simulators to advance propositions in these areas. Consequently, theory-building through simulation media should contribute to more elegant, complete, and systematic theory.

The question of the validity of the theory expressed through the simulation techniques will be a constant issue throughout this essay. The problem of simulation validity has many different phases, depending upon the type and purpose of simulation. The ultimate question—an intersubjective one—when evaluating a simulation is, however, its "heuristic pay-off."<sup>3</sup> The subjective nature of this issue precludes any individual attempt from resolving it. The hope here is that by verbalizing WPS, we will contribute to communication, and eventually agreement, between the simulation and non-simulation theorists on the extent to which the theory contained in the simulation is valid.

World Politics Simulation is a man-computer simulation of international politics. Although we are looking at WPS as a theory-

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<sup>1</sup> World Politics Simulation has undergone a series of modifications. The model analyzed here is WPS-II. The materials describing WPS-II, and used for this analysis are: *World Politics Simulation: Background Materials*, *World Politics Simulation: Participants' Manual*, and *World Politics Simulation: Administrative Manual*.

<sup>2</sup> This author's experience with WPS-II includes observing and administering the simulation at Wayne State University (1967-1969) and at the Industrial College of the Armed Forces (January, 1969).

<sup>3</sup> For an analysis of the type of theory required by a simulation model see Sidney Verba, "Simulation, Reality, and Theory in International Relations," *World Politics*, Vol. 16, April, 1964, p. 499.

<sup>4</sup> Hermann, Charles F., "Validation Problems In Games and Simulations With Special Reference to Models of International Politics," *Behavioral Science*, vol. 12, 1967, p. 219.

building technique, it has primarily been used as a teaching device.<sup>4</sup> The model contains national decision-making roles filled by human participants. As the roles are played, the simulation builds an environment for decision-making. The WPS decision-making environment consists of two constructs—a domestic and an international environment. The domestic environment is heavily programmed, and is represented by two feedback mechanisms. The Policy Influencer (PI) feedback represents domestic political support for the decision-makers from various political groupings in the society. The Economic-Military (E-M) feedback represents fluctuations in the economic development and military capability of each nation.

The international environment is not programmed; it only develops form and substance through the running of WPS. It consists of the confluence of foreign policy outputs from each nation. There are eight hypothetical nations and an international organization (I.O.) in WPS. The foreign policy outputs are actions such as trades, economic aid, propaganda, use of force, international agreements and communications.

Although the techniques of theory-building through simulation models may require precisely stated propositions; they may also result in an obscure form of expression. The task here is to derive the propositions from "simulation language" and to express them in verbal terms. The WPS propositions are contained in two different forms—in mathematical formulas and in the structural mechanisms of the model.

The following portions of this essay consist of four parts. In the first part, propositions relative to decision-making are examined. The decision-making propositions are derived from the structure and rules of WPS. The next section focuses upon propositions about the operation of the domestic environment. Propositions concerning the Economic-Military module and derived from the mathematical equations and tables of stochastic processes regulating its behavior, and from the structural relationships within the model. The propositions structuring the functioning of the Policy Influence module are contained in the PI Response tables, and in the relationships between the various groupings, and between the groupings and the decision-makers.<sup>5</sup> The third section is an analysis of the propositions associated with the international environment. WPS approaches international relations theory by focusing upon the domestic—rather than systemic—determinants of foreign policy. Consequently, there are relatively few systemic propositions; most of them concern the role or absence thereof of international institutions in world politics. The WPS propositions are listed serially with no commentary. The last section is an evaluation of the quality of WPS as a theory and of the "heuristic pay-off" of WPS for the development of a science of international relations.

<sup>4</sup> World Politics Simulation is now being used for teaching purposes at Wayne State University and at the Industrial College of the Armed Forces.

<sup>5</sup> The PI Response tables are tables of data predicting the response of specific political groupings to categories of decision-making actions. The data was collected from country specialists in the Department of State.

*Inventory of WPS Propositions*I. *Decision-making propositions*

1. All national decision-making units have similar role structures.
2. Role differentiation within a decision-making unit sometimes leads to conflict in the decision-making process.
3. Conflict patterns within each decision-making unit are similar.
4. The decision-maker's desire to remain in office is a crucial factor in decision-making action.
5. Foreign policy goals are a product of domestic conditions and of decision-makers' values.
6. Decision-makers operate in an environment of uncertainty and risk, but can take actions to reduce both uncertainty and risk.

II. *Propositions on the Functioning of the Domestic Environment*  
*Domestic politics propositions*

1. Domestic political forces are represented by the ability of domestic political groupings to render political support to the decision-makers, and by the attitudes expressed toward each decision.<sup>1</sup>
2. The domestic political forces of each nation may be viewed as eight to ten groupings.
3. The types of domestic political groupings vary for each country.
4. All domestic political groupings perceive the world in the same way.
5. All domestic political groupings behave in similar ways—expressing their attitudes to the decision-makers and rendering political support to the decision-makers.
6. All domestic political groupings react to the same decision-making actions.
7. Domestic political groupings are never entirely pleased by decision-making action.
8. Domestic political groupings react to foreign policy and economic policy decisions in terms of their gratification.
9. Domestic political groupings assess international events toward their state as hostile or friendly (e.g. communications), military or non-military (e.g. trade or aid), and as formal or informal (e.g. negotiations).
10. Domestic political groupings react to factors other than foreign policy and economic policy decisions in terms of their support for the decision-makers.
11. Domestic political groupings have the ability to remove decision-makers from office.

<sup>1</sup> The ability of domestic political groupings to render political support is symbolized by the WPS Power Weights. The political groups' attitudes are symbolized by a seven point WPS PI Satisfaction scale.

12. Domestic political groupings are able to reduce a nation's military and economic capability.
13. As the domestic political groupings become more dissatisfied with the decision-maker's actions, the probability of a revolution increases.
14. Domestic political groupings affect the capability of a nation to defend against subversive attacks.
15. Some domestic political groupings become more important in times of subversive wars than they normally would be in determining the capability of a state to defend against subversive war.
16. The ability of domestic political groupings to punish or to reward decision-makers does not vary, regardless of the type of decision-making action perceived.
17. It is easier for domestic political groupings to remove decision-makers from office in democratic countries during election years than in non-election years.
18. In autocratic countries, the amount of political support the decision-makers need to maintain in order to hold office is invariant over time.
19. The decision-maker's power to control the domestic political groupings is limited by the types and number of groups which may be manipulated, by the economic and military costs involved, and by the temporary character of such decision-making actions.

*Economic-Military system propositions*

1. All national economies have similar components (BC's, CU's, etc.).<sup>2</sup>
2. National economies vary in the amounts of basic resources they possess, and in their productivity rates.
3. The productive capacity of an economy is a function of the size of its basic resource base and of its productivity rate.
4. The productivity rate varies for each component product of the economy.
5. The capacity of the economy to sustain growth is limited by depreciation losses.
6. The growth of the productivity rate is a function of the size of the productivity rate and of the amount of total basic capability invested in development investment.
7. The productivity rates of the economy increase fastest, for each percentage unit of total basic resources invested in

<sup>2</sup> The propositions about the functioning of the Economic-Military system use the following terms, which are defined here in terms of the WPS concepts:

- a. *Basic resources*—The basic resources of the national actors are symbolized in WPS by Basic Capability Units (BC's).
- b. *Productivity rate*—The productivity rate is the ability of an economic system to produce its basic resources (BC's) into other products (e.g. FCn's, CU's, etc.). The productivity rate is symbolized in WPS by the Generation Rate (GR).
- c. *Products*—Products are components of the economy produced by the conversion of BC's. The products consist of the following: Consumer Units (CU's), Welfare Units (WU's), Conventional, Subversive, and Nuclear Capability Units (FC's, FCn's, respectively).
- d. *Development Investment*—The investments made in research and development are symbolized by Development Investment (DI) in WPS.

- development investment, when the economy is in the "Take-off" stage of development.<sup>3</sup>
8. There is a characteristic cross-national distribution of the various national economies' productivity rates.<sup>4</sup>
  9. Domestic political groupings perceive two aspects of economic development—the amount of goods and services produced, and the amount of economic capability invested in development investment.
  10. The demands of domestic political groupings increase in proportion to the growth of the economy.<sup>5</sup>
  11. Basic domestic economic policies affect the domestic political groupings.
  12. International trading can be based on the comparative advantage principle, but political groupings react on non-economic factors to trade.
  13. Domestic political groupings perceive the growth of military capability.
  14. The effectiveness of the use of force to gain political support is limited.<sup>6</sup>
  15. The use of force entails economic liabilities.
  16. Force can be used to subdue other forces.
  17. There are three types of military capability—nuclear, conventional, and subversive.
  18. There are two levels of military capability deployment—offensive and defensive.
  19. At the offensive level, there is no interchange between the three types of force, but there is an interchange at the defensive level.<sup>7</sup>
  20. Only the nations with the greatest economic capacity possess nuclear capability.
  21. Nations possessing nuclear capability have a retaliatory strike nuclear capability.

<sup>3</sup> The percentage unit of total basic resources invested in development investment is represented by  $Q_x$ , where  $Q_x = BC's$  in DI for GRx.

<sup>4</sup> The "Take-off" stage of economic development is defined in WPS as the stage where  $1 < GR > 1.5$ . See *WPS: Administrative Manual*, p. 45, for the formulas used to compute economic development.

<sup>5</sup> An analysis of the WPS economic systems at Zero Period has revealed that the "developing" nations have 70% of their Generation Rates in the "Take-off" stage, while the "developed" nations have only 33% of their Generation Rates in that stage. Therefore, the "developing" nations are able to make faster progress increasing their productivity, with less  $Q_x$ , than are the "developed" nations.

<sup>6</sup> The PI demands increase in proportion to the growth of the economy. For example, of the PI's demand for the current economic period an increase of 10% over  $n$  (where  $n$  is the amount produced in the previous economic period), then in the succeeding economic period, the demand will be for an increase of 10% over  $(n + .1n)$ . In the next period the demand will be 10% over  $(n + .2n + .01n)$ , etc. The demands will increase (if they are met each period; if not met, they will remain constant) until after 11 economic periods they will be more than double what they were in the first economic period in WPS. Therefore, the decision-makers are unable to satisfy permanently the Policy Influencer demands; they are ever increasing.

<sup>7</sup> The Policy Influencers perceive the use of force against other nations (some PI's support it; some do not); but they also perceive the economic and military results of the use of force. Consequently, the PI support gained in the initial use of force may be counteracted by the results of war—a decrease in military capability.

<sup>8</sup> Defensive Conventional Force Capability Units (FCs-D) or Defensive Subversive Capability Units (FCs-D) may be used to defend against subversive attacks.

22. Offensive nuclear capability is more difficult to produce than defensive nuclear capability.
23. An attacking nuclear force destroys both military and non-military sources of the defender's capability.
24. An attacking nuclear force always receives some destruction.<sup>8</sup>
25. As the attacking nuclear force becomes smaller in size, the destruction rates to it become greater.
26. In a conventional war, the attacker has a higher probability of losing more forces than the defender in an initial attack (if the attacking and defending forces are equal in strength).
27. In a conventional war, the attacker has a much greater probability of winning than does the defender in a counter attack, if the opposing forces are equal.
28. In a subversive war, the attacker has a 100 per cent probability of losing more forces than the defender, if the opposing forces are equal.

### III. *Propositions on the Functioning of the International Environment*

1. The International Organization (I.O.) serves as a setting for institutionalized cooperation and formal and informal communication between states.
2. The International Organization is dependent upon the states for financial support and legal authority.
3. The International Organization can make decisions which the states may feel they should enforce.
4. The staff of the International Organization enjoys very little autonomy.
5. In terms of formal legal, and institutional restraints, the state is an independent actor in the international environment.
6. International rules may develop organically, but they are flexible and amorphous.
7. Alliance blocs exist, but they can change.
8. Economic and military strength among the various states is distributed according to a bi-polar structure.

### IV. *An Evaluation of World Politics Simulation*

The purpose of this section is to analyze the contribution of WPS to the development of a science of international relations. There are two levels of analysis to this issue. At one level, the focus is upon the quality of "verbalized" WPS qua theory; at another level, it is

<sup>8</sup> Propositions 24 and 28 are contained in WPS' tables of stochastic processes.

upon the heuristic value of "operating" WPS.<sup>1</sup> At both levels, cursory reference is made to WPS in terms of the condition of contemporary international relations theory.

The issue of the intrinsic value of a theory relates to its structure as a deductive, systematic, and empirical body of thought. Most philosophers of science agree that the ideal type of theory is composed of a limited number of universal propositions with a high degree of explanatory power; that the theory's component propositions propose precise relationships; and that the theory produce, by the rules of deduction, increasingly specific predictions that are empirically testable. It is also agreed that the predictions' degree of correspondence to the explicanda\* is one rule for assessing the theory's validity.<sup>2</sup>

As a formal theory in a verbalized form, WPS is not the ideal type. It does not consist of a small number of propositions that possess a high degree of explanatory power; rather, it is composed of a large number of general statements that have a low degree of explanatory power. A proposition's explanatory power inheres in its ability to produce specific empirical propositions (or predictions). The ability to produce specific empirical predictions depends upon three distinct factors—the proposition's levels of generality, universality, and specificity. WPS's propositions possess high levels of generality and universality, but low levels of specificity.

A proposition's level of generality partially determines its explanatory power. A proposition gains in explanatory power as its level of generality increases. The generality of a proposition refers to how many different classes of empirical propositions may be deduced from the original proposition. The range of phenomena subsumed under the proposition's subject is the locus of this quality. For instance, Newton's laws of gravitation gain their power along the dimension of generality because they include not only the class of empirical propositions predicting how specific apples fall, but they explain the forces of attraction between all bodies. The WPS propositions are at a high level of generality—a variety of different classes of empirical propositions may be derived from each component proposition. For example, from the assertion that "All domestic political groupings perceive the world in the same way" it can be predicted that military groups, bureaucratic groups, political parties, economic interest groupings, and others have similar perceptions of the world.

A second factor involved in determining a proposition's explanatory power is the frequency with which the proposed relationship

<sup>1</sup> The World Politics Simulation is conceptualized here as constituting two distinct theories. The substantive assumptions about international politics constitute "verbalized" WPS. The preceding propositional inventory represents "verbalized" WPS. The interaction of the substantive assumptions and the methodological assumptions of the simulation (i.e. assumptions introduced into the model via the use of surrogate decision-makers) through a simulation "run" constitute "operating" WPS.

<sup>2</sup> The philosophy of science notions assumed here have been stimulated primarily by the following fine works: Homans, George C., *The Nature of Social Science*, (New York: Harcourt, Brace, & World, Inc., 1967), Kaplan, Abraham, *The Conduct of Inquiry*, (San Francisco: Chandler Publishing Co., 1964), Meehan, Eugene J., *The Theory and Method of Political Analysis*, (Homewood, Ill.: The Dorsey Press, 1965), Nagel, Ernest, *Logic Without Metaphysics*, (Glencoe, Ill.: The Free Press, 1956), Nagel, Ernest, *The Structure of Science*, (New York: Harcourt, Brace, & World, Inc., 1961), Popper, Karl R., *Conjectures and Refutations*, (New York: Basic Books, 1962), Popper, Karl R., *The Logic of Scientific Discovery*, (New York: Harper & Row, 1959), VanDyke, Vernon, *Political Science: A Philosophical Analysis*, (Stanford, Calif.: Stanford University Press, 1960).

\* EDITOR'S NOTE: This word does not appear in standard American dictionaries.

between the subject and object obtains. A proposition gains in power as the probability of its prevalence increases. The most powerful assertions—universal propositions—are those which prevail at all times. The proposition that “Domestic political groupings are never entirely pleased by decision-making” is a universal proposition. Except for the unprogrammed relationships that may exist or develop in the international environment, the majority of WPS propositions are universal.

The final and most important factor which partially determines the proposition’s explanatory power is the specificity of the proposed relationship between the proposition’s subject and object. The proposition gains in explanatory power as the specificity of the relationship increases. The difficulty with the “verbalized” WPS’s component propositions is that the majority of them (for reasons analyzed below) fail to establish precise relationships. For example, the proposition that “The decision-maker’s desire to remain in office is a crucial factor in the decision-making process” is low in explanatory power along the dimension of specificity because it does not hypothesize how or why the desire is crucial. The lack of specificity in the WPS propositions is crucial—unless a proposition maintains high levels along all three dimensions, its explanatory power is impaired.

The major difficulty with WPS as a verbalized theory is that it can not be used to make specific empirical predictions. There are a multiplicity of reasons for this incapacity; they relate immediately to the structure of WPS, and in a larger sense to the unique characteristics of the phenomena of international behavior and to the general state of knowledge about that behavior.

The ability of WPS to produce empirical propositions is inhibited by the imprecise relationships which obtain within the model—little in logic can be deduced from amorphous relationships.<sup>3</sup> There are two aspects to the imprecise quality of the WPS relationships. The primary locus of imprecision exists *within* the propositions themselves (as analyzed above). A secondary source of imprecision derives from the relationships that prevail *between* the component propositions. This latter aspect involves the theory’s systematic quality. WPS is not a hierarchially-structured, deductive theory; rather, it is a list of factors that are in some way related to the phenomena of international relations. The exact way in which the individual factors determine the patterns of international behavior is not established.

“Verbalized” WPS is at a high level of generality—the relationships it proposes prevail for many different sets of conditions that may exist within a loose bi-polar international environment. Relationships that obtain for many different international conditions (even within the parameters of a loose bi-polar structure) lack a high degree of specificity because their manifestation depends sharply upon the contingencies of each context. Herein lies the difficulty of using “verbalized” WPS as a predictive device—its context is too general for the derivation of specific propositions. George C. Homans notes the crucial role of the theoretical context by stating that “Our frequent experience in social science is to find that a proposition holding

<sup>3</sup> Homans, *Nature of Social Science*, p. 25.



good in one set of circumstances does not hold good in another."<sup>4</sup> For instance, the proposition that "The decision-maker's desire to remain in office is a crucial factor in decision-making action" may oscillate from being very crucial to not so crucial, depending upon its specific context. Hence, in deriving empirical propositions, it is indispensable that specific contexts be defined.

The contention here is that non-predictive theories ("verbalized" WPS and most other theories of international relations) are insufficient—the test of explanation ought to be prediction.<sup>5</sup> Although this may be an ambitious criterion to impose upon the study of international relations, we do not believe that it is held in vain. Indeed, WPS as an "operating" theory portends to be a seminal tool for the development of more powerful (perhaps predictive) theory; the remainder of this essay suggests how WPS may be useful in contributing to systematic international relations research and theory-building.

International Relations has experienced much difficulty in moving down the long road to more powerful theory.<sup>6</sup> Much of this difficulty has arisen from the nature of international behavior itself. Prediction is possible only in areas where the number of variables are limited and known in advance, and where the relationships of the variables are specific. The numerous and complex variables associated with international behavior, and the obscure relationships prevailing between them have been persistent stumbling blocks to the development of predictive theory. WPS, as an "operating" theory, meets these exigencies.

WPS does not eliminate the problems associated with the prediction of international affairs, but it does mediate them. WPS consists of several variables assumed to be crucial determinants of international relations. Although WPS contains too many factors to be called an elegant theory, the criterion of elegance is expendable for an operating theory.<sup>7</sup> The value placed on elegance originated partially for aesthetic reasons, and partially for pragmatic ones. In a predictive verbal theory, the number of variables must be at a minimum to permit logical deduction. WPS circumvents the necessity to be elegant by not operating in a deductive fashion; rather, it purportedly operates in a way analogous to the referent system.<sup>8</sup>

<sup>4</sup> *Ibid.*, p. 85. Hoffman also notes that "Each concept we use has a different meaning in different contexts of space and time." In Hoffman, Stanley H., "International Relations: The Long Road to Theory" in Rosenau, James N. (ed.), *International Politics and Foreign Policy* (New York: The Free Press, 1961), p. 430.

<sup>5</sup> Homans, *op. cit.*, p. 105, notes "But prediction runs parallel to explanation: the two problems are really the same one. And the better we are able to explain what has happened, the better we shall be able to predict what will."

<sup>6</sup> See Hoffman, *op. cit.*

<sup>7</sup> Note Kaplan's (*op. cit.*, p. 317) observations on the issue of elegance: "Indeed, the argument can sometimes be made against a theory . . . that the trouble with it is that it is too simple; Nature sometimes seems to prefer complexity."

WPS may be considered by some to be an elegant theory because it is composed of a small number of concepts—Policy Influencers, Economic-Military system, a Decision-makers. However, each concept is really a cluster of several variables.

<sup>8</sup> "Operating" WPS achieves its operating quality through the surrogate function of participant decision-makers. The methodological assumptions of this technique are of dubious validity and need further investigation. Some of those assumptions are: college students (sometimes professionals) may be used to represent real world decision-makers, a simulated environment (where the decisions made are not for "keeps") may be used to represent an environment in which the decisions made often have weighty consequences for many people, and simulated time periods (which last only a few hours) may be used to represent physical time periods of several years during which the decision-makers accumulate and have reinforced much experience.

The problem of how variables combine to produce social phenomena looms large in social science. Abraham Kaplan has noted that,

'The rules of combination are not logically necessary principles. Even in the simple case where all factors are favorable, it does not follow that the combination of them will be favorable.' We need to know, not only the separate factors that are determinative of behavior, but how they interact with one another. It is not always possible to advance step by step; to arrive at a good theory may call for as much boldness as imagination.<sup>9</sup>

WPS provides an imaginative, if bold, approach to combining the variables hypothesized to be determinative of international behavior. The variables of "operating" WPS interact through the medium of participant decision-makers' behavior. This surrogate function is at once the source of "verbalized" WPS's weakness as a predictive theory, and "operating" WPS's source of utility as a theory-building device. It is extremely difficult (if possible) to deduce predictions from "verbalized" WPS's component propositions because the rules by which the variables combine to produce certain phenomena are unknown. In the case of "operating" WPS, it is not necessary to know the rules of combination; they are provided by human participant decision-making processes. The heuristic value of WPS is that it readily permits the analysis of the rules of combination followed by the participant decision-makers under various conditions.<sup>10</sup>

"Operating" WPS possesses two distinct qualities which contribute to its value as a theory-building device. In a technical sense, WPS has the qualities of a laboratory type research tool: it affords the researcher the opportunity to replicate his tests, and to manipulate and to observe directly his data—a situation rarely existing in the referent system. WPS's ability to generate a rich supply of data, also rare in the referent system, is another of its technical advantages. In a theoretical sense, WPS possesses the qualities and capabilities of a predictive theory. This latter set of qualities particularly recommends WPS for theory-building purposes in international relations.

A paradoxical tension exists between the generality of a theory and its explanatory power. Stanley Hoffman has conceptualized this paradox as the "social scientist's dilemma: a 'social whole' such as a total field can never be grasped scientifically, and we can only deal with selected aspects. But if we do not start with at least an approximation of the whole, and concentrate either on single trends or on limited empirical research, those fragments of the whole can not be assessed correctly."<sup>11</sup> We concur in Hoffman's assumption that the most feasible approach to building theory is to trade-off higher levels of generality for lower levels of specificity in order to maximize explanatory pay-offs.

<sup>9</sup> Kaplan, *op. cit.*, p. 326.

<sup>10</sup> As noted in the introduction, simulation theories supposedly force the simulations theorist to develop complete theories; and often he may be forced to advance propositions in theoretically underdeveloped areas. This may be true if the simulation is all machine; but the use of human participants in a man-machine model relaxes this requirement considerably.

<sup>11</sup> Hoffman, *op. cit.*, p. 431.

"Operating" WPS creates theory which maximizes explanatory power pay-offs. WPS as an operating theory reduces the generality of "verbalized" WPS for all bi-polar conditions to specific types of conditions within the bi-polar parameters. Through its operation, as the participant decision-makers follow the rules of combination, the component propositions of WPS assume specific relationships within a specific international context: or, in other words, through its operation WPS provides empirical predictions within specific contexts.

The suggestion here is to analyze the simulate\* relationships as they obtain within specific international contexts. This proposal may be a way out of the "social scientist's dilemma": by limiting research to specific contexts of the international system, it may be possible to discover the dominant variables and their rules of combination within each context. There are various practical ways to conduct such research. The international context may be programmed, or it may be allowed to develop freely. In either case, the simulator may derive from an analysis of the simulate\* context middle range theories explaining the effects of international conditions on state behavior, or vice versa. If the international environment is programmed and held as a constant, then the simulator is limited to exploring the national actors' reactions to their environment. On the other hand, if the international context is allowed to develop freely, then the simulator may explore the relationships between national actor behavior and change in the international system. For instance, if the international context is programmed with specific relationships existing at time  $t_0$ , and then allowed to develop freely to time  $t_1$ , it may be possible to discover the dynamics of change from one context (e.g. war) to another (e.g. peace). Research interests dictate the particular technique of analysis used.

The objective in using this approach to theory-building is to develop a series of macro theories at a middle level of generality.<sup>12</sup> Each theory would be macro because its primary focus is upon systemic behavior; each one would be at a middle level of generality because its focus is upon a specific context of the international system. If the concentration in International Relations remains on developing overarching grand theories (e.g. "verbalized" WPS and to a greater extent Easton's systems analysis model), explanatory power will continue to be sacrificed for high levels of generality. Of course, however, the ultimate test of the value of theories derived from an analysis of simulate conditions is how useful they are in explaining the referent system.

In concluding this essay, we come to the ultimate issue, WPS's validity. The notion of validity is complex conceptually and empirically. Here validity is conceptualized as being composed of three different dimensions—value as a predictive device, value as a heuristic tool and coherence to the established bodies of thought. There are no foregone conclusions about WPS's validity along any one of these

<sup>12</sup> Hoffman (*Ibid.*) notes that International Relations needs macro theory in order to be an autonomous discipline.

\* EDITOR'S NOTE: This word is not listed in adjectival form in standard American dictionaries.

dimensions. In closing, our objective is to indicate areas that need further consideration in evaluating WPS.

The supreme test of a theory's validity is in its ability to predict occurrences in the real world. "Verbalized" WPS is not capable of prediction, but "operating" WPS does possess that capability. However, we doubt, and have not argued, that "operating" WPS will predict specific real world events. Rather, the contention is that it develops theoretical relationships in specific simulate\* contexts; and an understanding of the simulate\* relationships may be useful in understanding the empirical relationships of similar real world situations. This quality of WPS relates to the second dimension of a theory's validity, its heuristic value. The heuristic value of WPS lies in its ability to facilitate research, to stimulate new questions, and to suggest theoretical relationships. WPS's heuristic utility is, in the last analysis, an empirical question to be determined by its actual application as a theory-building device.

A third test of a theory's validity is whether the relevant scholars believe or do not believe that it should be published and used for research and teaching.<sup>13</sup> This aspect of a theory's validity is "a subjective question or, better, an intersubjective one."<sup>14</sup> The question of intersubjective validity is a crucial area for WPS: some relevant scholars express jaundiced views about anything smacking of "simulation". This skepticism probably derives partially from a communications gap created by the simulation language. The effort here has been to close that gap by verbalizing WPS; and the anticipation is that a meaningful dialogue between the simulators and nonsimulators will ensue. Pending that dialogue, there can be little confidence in WPS's intersubjective validity.

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\* See Editor's Note on previous page.

<sup>13</sup> Kaplan, *op. cit.*

<sup>14</sup> Van Dyke, *Political Science: A Philosophical Analysis*, p. 191.