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Action Styles and Management Game Performance and Exploratory Consideration

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The impact of action styles or the manner in which an operator behaves when faced with decisionmaking situations has long been intuitively felt to be a significant influence in determining the operator's chances for success. The tentative results of a recent study—which employed the management game TEMPO as an instrument to compare decisions made by teams exhibiting strategic and potent action styles—seem to suggest that under certain circumstances action styles do make a difference. While more exhaustive study is certainly required before management can hope to have concrete formulae describing the optimum blend of strategists and potents for different situations, investigations of this sort are as valuable for the questions they raise as they are for those they answer.

ACTION STYLES AND MANAGEMENT GAME PERFORMANCE:

AN EXPLORATORY CONSIDERATION*

A research paper prepared

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Introduction. The staffing of bureaucracies is always a problem, particularly in the higher echelons. Although general works on bureaucracies vary in approach when they suggest implicitly that decisions are made by individuals,[1] when they discuss the philosophy of management techniques,[2] or when they treat methods of organization,[3] they tend to be similar at least in suggesting that there are optimum styles or organizations. Such publications also imply that ideal individuals are needed or wanted. The present report does not solve the problems of staffing, but it offers the hypothesis that in addition to the need for individual skill and competence in bureaucratic decisions and performance, the presence of expressively balanced teams is also important. While the research described here deals with the artificial context of a management game, it tends to show that it is

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not the ideal individual alone, but rather the combination of different types of individuals that releases the greatest potential of the group.

If the experience, competence, and intelligence of the players making up the teams in a two-sided management game are equivalent or roughly equivalent, then the presence or absence of expressive styles of play among the members of the competing teams should have a definite bearing on the outcome of the game. This exploratory study examines this proposition within the context of a resource management game known as TEMPO which was played on two occasions, first in 1969 with 42 teams (21 games) and then in 1970 with 12 teams (six games). The outcomes of the 27 games support the proposition, but it must be admitted that so many questions have been raised by the study that additional research will have to be conducted before the relationships described here can be accepted in general. At the very least, however, the study should be replicated and its hypothesis given serious consideration in the future.

Just as linguists distinguish between natural and artificial languages, a distinction can be made between natural and artificial games. Natural games include such familiar events as baseball, football, chess, poker, bingo, et cetera, whereas artificial games have been constructed in such fields as education, business, war, et cetera. Games in both categories are alike in having two or more sides, rules of play, criteria for determining winners and losers, and so on; they also seem to be explicit or implicit models of activities which occur, which might occur, or which are believed to occur in the larger culture.

In some important respects, however, the two categories differ. Natural games fill expressive needs for the players and spectators, whether they be recreational, ceremonial, or expressive in some other way, but artificial games are more directly instrumental in that they are designed to educate the players, to produce new relationships, or to serve some other useful function. Usually natural games have survived for longer periods of time, and they may be diffused or transmitted by informal as well as by formal means. Some of them are broadly known and understood in cultures, often to the extent that their terminologies are part of the popular vocabulary and their play produces metaphors for other activities in the culture. This last can be carried to sophisticated levels as when Boorman uses wei chei, a natural game widely played in the Orient, to organize his discussion of Maoist revolutionary strategy.[4] American natural games are fun, at least for some of the players and spectators, and thus they are *expressively* compatible with the larger culture. Artificial games, on the other hand, are seldom played for fun although some players often find them enjoyable. They have been recently invented although war games have a respectable history, and they are seldom transmitted or diffused spontaneously and informally. While some artificial games may be sufficiently expressive to become natural games in time, even this development is likely to entail substantial modification and change as the game is played over time.

In this report a set of action styles derived from the investigation of the expressive characteristics of natural games will be related to artificial game performance. Space does not permit the full description of the specific research in natural games which is antecedent to this particular study, but it is possible to provide some relevant citations. A central group of papers dealt with games primarily from a cross-cultural perspective.[5] Other papers dealt with natural games in American culture,[6] and still others dealt with such related subjects as power[7] or expressive self-testing[8] or more general patterns of involvement.[9]

Some of the points most relevant to the present inquiry which are based on this earlier research will be given below.

Natural games can be classified in many different ways, but here they are divided into three basic types: games of physical skill, games of strategy, and games of chance.[10] The outcomes of all games are determined in three basic ways, either singly or in combination. They may stem from the use of strong muscles and deft motor skills (physical skill), from making clever decisions (strategy), from a dependence upon random human behavior such as guessing, or on randomizing devices such as dice (chance), or from any combination of these. If physical skill is at all a factor in determining the outcome of a game, the game is arbitrarily designated as one of *physical skill*, but games of this type may be further subdivided into games of pure physical skill, games of physical skill with strategy, games of physical skill with chance, and games of physical skill with strategy and chance. If the attribute of physical skill is *absent* and if the attribute of strategy is present, the game is arbitrarily designated as one of *strategy*, and games of this type can be divided into games of pure strategy and games of strategy with chance. Finally, if both the attributes of physical skill and strategy are absent and the attribute of chance is present, the game is termed a game of *chance*. Artificial games also fall into these three categories; a war game, for example, is usually a game of strategy with chance.

Natural games have had a long and complex cultural history.[11] A small number of cultures lack games so games are not a cultural universal, but games of physical skill are almost universally distributed. These games must be very old in culture. Games of chance have a more restricted, but still broad, distribution, and they may have been the next type to appear. Finally, games of strategy have much more limited distribution which appears to be restricted, or nearly restricted, to societies with some cultural complexity in both the Western and Eastern Hemispheres. Without exception the most complex societies have games of strategy and the very simple societies lack them. American culture has all three types on the popular level; games of physical skill (e.g., baseball, football, tennis, table tennis, soccer, and many others); games of strategy (e.g., chess, checkers, bridge, poker, rummy, and many others); and games of chance (e.g., lotteries, craps, bingo, the numbers, and many others). There is a puzzling class of societies possessing both games of physical skill and games of strategy which lack games of chance, but this group need not concern us here. The main line of cultural development appears to be the following: (1) games absent; (2) games of physical skill; (3) games of physical skill and games of chance; and (4) games of physical skill, games of chance, and games of strategy. It may be the case that artificial games represent yet another step in this development.

In the main, games are explicitly or implicitly models of cultural activities which occur in the "real" world. Thus, it is very likely that traditional games of physical skill are modeled after hunting and other physical activities; games of chance appear to be modeled on divination; and games of strategy parallel such activities as war, business, diplomacy, and other forms of social interaction. Games, then, of the three major types model different activities. These models vary greatly in verisimilitude (the degree to which they fully represent the background activity), but all of them seem to be expressively compatible with both the background cultures and with the personalities of the people who play and who watch the play. The most important assumption of this study is the assumption that expressive involvement in artificial games by individual players will resemble the expressive involvements of the players of natural games.

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Other research has dealt with game and model involvement, and the general approach thus developed will be used here.[12] Yet, while the scheme to be outlined below has had some success, its inadequacies are becoming increasingly apparent with each additional study. Still, it will serve for the present investigation. This theory of model involvement holds that there is always a domain in the real world which is modeled explicitly or implicitly by the model. Within this real domain there may be one or more psychological "conflicts" which are particularly relevant to the model. These conflicts lead to curiosity about the model and to involvement in it. Thus, with games of strategy, it may be the case that approach and avoidance attitudes toward command conjoined with approach and avoidance attitudes toward obedience constitute an antecedent conflict which may lead to involvement in games of strategy. Where there is a conflict, it is held that the greater the conflict, i.e., the more closely the approach and avoidance attitudes are balanced, the greater the involvement in the model. Once a person is involved in a model, he also acquires new knowledge and skills (enculturation) which may have relevance or potential relevance to the real world outside the model, and this new learning may sometimes affect the real world conflict domain in such a way that the antecedent approach-avoidance balances are changed. This has been termed the conflict-enculturation theory of model involvement.[13]

Levels of involvement can vary for every model. Ordinarily the persons who are most in conflict are most involved in the appropriate model. For the remaining persons, those who display stronger approach attitudes than avoidance attitudes toward the antecedent activity should be next most involved. Finally, those who possess stronger avoidance attitudes than approach attitudes should be least involved or not involved at all.[14] One additional point should be made. It seems to be the case that the higher the antecedent conflict, the lower the need for verisimilitude or realism in the model.[15]

Earlier research dealt with a series of action or power styles derived from the game classification.[16] It was argued that since the games were probably acceptable models of activities occurring elsewhere and since they were expressively compatible with the personalities of the players, the typology of games might suggest a typology of action or power styles. In a metaphorical sense some people approach life as if they were playing games of physical skill; others, games of strategy; and still others, games of chance. These major action styles have been labeled (1) potent, (2) strategist, and (3) fortunist. The major types include such mixed types as potent-strategist, potent-fortunist, and strategist-fortunist, but most college students seem to be either potent-strategists or strategist-fortunists (fortunists are almost nonexistent in this group). This study will deal only with potent-strategist and strategists (a category which groups pure strategist and strategist-fortunists together).

Every adult in our society has probably had experience with every action style at one time or another, and every adult with greater or lesser facility can use any action style if the situation warrants it. Yet the evidence would suggest that every adult has a preferred action style which best suits his personality and that he is more likely to use this style in most action situations.

Action styles may also be used somewhat symbolically or metaphorically. The game of poker, for example, is a game of strategy with chance, and thus it is especially well suited expressively to the strategist-fortunist player. Everyone familiar with the game, however, knows the player who "bulls" his way through game situations as if he were

using muscle and physical skill in the play. On the other hand, there is the inept player who treats the game as if it were a game of pure chance and who bemoans his "bad luck." This last player is playing a game of strategy and chance with a fortunist action style. It is likely, then, that individual players of a military resource management game (a game of strategy with chance) may display a potent-strategist action style (metaphorically speaking), or they may display the strategist-fortunist style which is fitted to the game.

The characteristics of the potent-strategist and strategist action styles have yet to be listed in full. A few impressions based on ongoing research can be offered. The potent-strategist has a strong orientation toward high achievement (and some conflict about it) and self-reliance. He may have a fear of failure and he may have an exaggerated perception of risk. He is likely to focus on goals which are clearly defined and attainable. He may be politically more conservative and less of a strategic risk taker in general than the strategist. The strategist is more likely to be in conflict over obedience and responsibility than the potent-strategist.[17] He is likely to be less central politically than the potent-strategist. He may be more likely to be an expressive self-tester. He does not engage in judgmental accentuation of risk, but in strategic play he may well take larger risks. Potent-strategists may play to win, but they must draw if nothing else. Strategists, above all, play to win.

Persons with these and other styles can and do play TEMPO.[18] This game is played by two teams of five to eight players each. It is designed to demonstrate various management principles, primarily the use of marginal analysis in the area of cost effectiveness, a tool in allocating scarce resources (in this case defense budget dollars). Each team has at its disposal a limited budget and various investment opportunities, including operation or acquisition of currently available weapons systems, research and development of new weapons systems, or intelligence about its opponent's activities. The game is played over a number of game years. During each game year, war (initiated by the umpire group) may be declared between the two teams.

Normally, the first series of game years, up to 5, are played separately with team-umpire interaction after each year. The final series of game years, typically game year 6 through year 10, are played in a block as a long-range planning exercise. Since there is no team-umpire interaction between years during this final stage, no wars occur and no intelligence can be provided on the enemy's activities.

Each team is allowed approximately 45 minutes for each active game year and about an hour for the final block of years. During the period they must prepare and submit to the umpire group a budget sheet indicating how they have spent their funds. Teams are penalized for late submission of budget sheets, overexpenditure of funds, or losing a war. All penalties are in the form of dollar reductions of the following year's budget.

Weapons system effectiveness is assigned an arbitrary value in the form of "utils." These figures are fixed by the rules of the game for all systems. Operation of defensive systems will tend to neutralize an opponent's offense insofar as total offensive utils are reduced by an amount equal to the opposing team's defensive utils in matching systems, the result being termed "net offensive utils." The team with the larger net offensive util total during a war year is declared winner of the war. The team with the larger net offensive util total at game's end is the winner of the game. The fact that this util score is the result of independent choice by two separate teams is important for it permits an appraisal of the correctness of a predic-

tion that one of the competing teams will be superior to the other.

TEMPO is a game of strategy characterized by imperfect information as follows. At any given point, teams are not fully aware of investment opportunities yet to be disclosed. In the early stages of research and development, projected costs, production limits, and time to complete research and development are only estimates and subject to change. Intelligence, even if purchased, provides only estimates of the opponent's activities. War, which may only be declared by the umpire group, may occur at any time, and teams are notified of the occurrence of war only after they have completed their budget allocations for that year. In short, from the viewpoint of the players, there is uncertainty and a lack of complete information.

Team organization, designation of leadership, and specialization of tasks are left to the members of each team. In this sense, each team can be considered a decisionmaking group with a self-defined mode of operation.

In general, a team which spends its money to operate and acquire currently available systems in the early years of the game at the expense of research and development will lead its opponent during these years in terms of the net offensive util comparison, and it will win wars occurring during this period. Teams, however, that invest heavily in research and development in the early years will tend to lead during the latter stages of the game as they begin to bring more efficient systems into operation. Although the authors observed as many games as possible, they only gained impressions of play. It is not really known how team members with the different action styles actually functioned in the course of game play. Free interviews suggested that play by potent-strategists, on the one hand, and play by strategists, on the other, might differ in a number of ways. A potent-strategist, for example, might operate and acquire available systems with limited research and development investment, thus emphasizing low development costs and quick delivery. The strategist might invest heavily in research and development, especially in systems with projected high payoff, regardless of development costs and prolonged delivery times. Again, the potent-strategist might make the error of failing to invest in high payoff research and development programs and thereby suffer a future disadvantage. The strategist, on the other hand, might fail to acquire and operate sufficient systems, even highly efficient ones, so long as more attractive alternatives existed in the horizon which would require still further research and development expenditure.

Ultimately it will be necessary to determine exactly how and why potent-strategist and strategist behave as members of teams. If they do influence decisions, for example, how do they do so? The present study, unfortunately does not go this far. It only asks whether or not the mere presence or absence of potent-strategists, strategists, or persons lacking clearly defined action styles as resources for a team makes a difference as far as game outcomes are concerned. Each team has its own resource pattern, and it is this resource pattern which must be judged and compared.

It can be argued, however, that the ideal team should have both potent-strategists and strategists as resource elements. Here the potent-strategist and the strategist act as a check on each other's extreme strategies, producing a combined program which achieves an operation/research and development mix approaching the optimum game strategy.

While inferior to the potent-strategist and strategist team, the strategist only team should be superior to the potent only team. Within the framework of the

TEMPO game, the error of the potent-strategist of noninvestment will ultimately be more serious than the error of nonoperation by the strategist for two reasons. First, the lead time on research and development is at least 2 and generally 3 years for the most efficient weapons. This means that at least 3 years and in most cases 4 years will be required to bring a system which has never been developed into operation. On the other hand, bringing a system which is already fully developed into operation takes, at most, 2 game years. Thus it will take longer to recover from a noninvestment error (potent-strategist) than from a nonoperation error (strategist). Second, within the TEMPO framework, unlike the real world, investment opportunities diminish almost to zero by game end. Thus the strategist, despite his possible desires to continue investing in new systems, will be forced to expend some of his funds in other ways, that is, in operating rather than developing systems.

The teams possessing no members with distinctive action styles should lose to all others because they lack the motivations and strengths of both the potent-strategist and strategists.

In summary, then, the prediction for the game outcomes was that teams numbering at least one potent-strategist and at least one strategist among their members would defeat all other possible teams. Teams possessing at least one strategist but lacking potent-strategists should defeat all teams other than potent-strategist plus strategist teams. Teams with at least one potent-strategist should defeat the teams lacking both potent-strategists and strategists. Indeed, these last teams should lose to every other team. These classes of teams can be arranged ordinally in order of probable success.

A final point should be made. Although the action styles can be linked to personalities, they are only roughly estimated types useful in complex multivariant situations where it is impossible to make finer grained distinctions quickly and unobtrusively. It should be the case, however, that individuals classed as potent-strategists, strategists, and others differ in personality dimensions other than those discussed here.

TABLE 1—TEAMS LISTED IN ORDER OF EXPECTED RANK

1. Potent-Strategist + Strategist Teams
2. Strategist Teams
3. Potent-Strategist Teams
4. Other Teams

The Research. This study falls into three parts: (1) the first set of TEMPO games, (2) the second set of TEMPO games, and (3) the personality study. The first set of games was played at the Naval War College by naval officers ranging in rank from lieutenant commander to captain. Although there were differences in rank and in experience, all of the participants in the game play were highly selected and promising officers. It is a good working assumption that all were well educated, highly intelligent, and very competent. It is precisely in such a situation where other variables are roughly controlled that expressive variables might make the difference.

Fifty-two teams, ranging in size from five to seven officers, played TEMPO simultaneously through an 8-hour day. Ten game years were played, the first five individually and the second five in a block. All players received a 30-minute briefing just prior to game play in which the rules, procedures, time schedules, et cetera, were discussed. This briefing was substantially the same for all players.

Upon completion of play, all players were given a short questionnaire designed to elicit their immediate reactions to their experience and to provide data permitting their being coded individually as to action style. This

questionnaire was designed and administered before the investigators knew the outcomes of the games although the players themselves knew the outcomes at the time they answered the questions (a possible source of bias). The players, however, were not told about action styles. The questionnaire was presented as a request for information which would aid in planning future games (a true statement).

The questionnaire contained the following key questions:

> Educational games often serve their purposes when they have a relevant, logical structure, but they are more effective when there is also some emotional or non-rational appeal. In assessing your TEMPO experience, how absorbed or involved were you in the game taking the full period of play into consideration?
>
> *Circle One Number*
>
> (Low Involvement) 1 2 3 4 5 6 7 (High Involvement)
>
> Realism in educational games is only obtained at some cost in terms of personnel, time and other resources. On the other hand, games suffer if there is no realism. If you were designing a TEMPO-like game with the same practical educational objectives in mind as TEMPO, which of the following options would you take?
>
> *Circle One Number*
>
> (Low Realism, Low Cost) 1 2 3 4 5 6 7 (High Realism, High Cost)

These Questions require some explanation for they constituted the basis for the action style classification.

The first question is straightforward. Obviously strategists should be higher on involvement in this game of strategy with chance than potent-strategists. With the second question, the strategists should be lower on realism since they should place less value on verisimilitude, while the potent-strategists should place a greater value on realism even at the price of higher cost. Potent-strategists, then, were defined as respondents who were low on involvement and high on realism. Strategists were defined as respondents who were high on involvement and low on realism. Respondents who were both high on involvement and realism and low on involvement and realism were placed in a residual category. Respondents who were very low on both involvement and realism were thought to be liabilities in their teams with the result that their presence could be used in breaking ties.

After action styles of the team members were coded, the team composition was established, and the associated outcomes were determined. It was not possible, here, to determine team composition in advance. This first set of games simply constituted a situation which was subject to very little manipulation.

Of the 26 games played, 21 were defined as usable for research purposes. The other five were discarded because of absent data—some respondents did not complete the questionnaire in full, and the absence of a single score eliminated the two teams in the game from consideration. All in all, 300 respondents provided usable information, and 256 of these were in games which could be accepted.

The second set of games was played after the preliminary analysis of the data provided by the first set had been completed. In this set 59 players grouped into 12 teams played six games. These players were Reserve officers with the ranks of lieutenant commander and commander, and they also appeared to be equivalent in terms of competence and intelligence.

These players were given a pregame questionnaire which elicited the favorite game played, involvement in games of strategy, involvement in games of

physical skill, involvement in games of chance, preference for being a director of a large-scale organization, preference for being an influential person behind the scene, and preference for an occupation which might involve physical hazards. In addition, they solved six Tick Tack Toe problems designed to determine whether they played to win or to draw in a simple game of strategy. Time did not permit the full analysis of the results of this questionnaire before game play, but it was possible to make an impressionistic judgment of the action styles of the respondents. Teams were then assembled in such a way that the hypothesis that teams containing both a potent-strategist element and a strategist element would defeat all others. It might be noted that none of these respondents knew anything about the TEMPO game before play or about the research which was being conducted.

With the second set of games, TEMPO was played for a 6-hour period. Eight game years were played, the first four individually and the last four as a block. Wars occurred in years 2 and 4. In all other respects, this game was the same as the earlier one. The two sets of games were enough alike to permit comparison for present purposes. The same postgame questionnaire was administered to these players on the conclusion of play.

Finally, as part of quite a different venture reported by Robinson in a paper entitled "An Element of International Affairs–The Military Mind,"[19] personality data were collected on 200 of the respondents who had completed the postgame questionnaire in the first set of games. It was possible to relate the information provided by this elaborate inventory to the somewhat arbitrarily defined action styles to see whether or not these styles had some independent validity.

The Results. Because of the skewed distributions, the categorization of action styles for the first set of games was somewhat arbitrary. Basically, strategists were defined as being above the median involvement and below the median on realism, and the potent-strategists were the reverse. In detail, though, the strategists were coded as having involvement of seven or six, and this figure had to be greater than or equal to the realism score plus two. Potent-strategists had realism scores which were seven or six and which were greater than the involvement score. The high residuals, respondents who were high in both realism and involvement, had the following scores with involvement listed first–7,7; 7,6; 6,6; 6-5. The intermediate residuals had scores of 5,5 or five or less on involvement and five on realism. The low residuals had scores of four or less on both involvement and realism. Seventy-six respondents were coded as strategists, 25 as potent-strategists, 73 as high residuals, 47 as intermediate residuals, and 32 as low residuals. The total number N was 253. The outcomes, though, were based on the presence or absence of the 73 strategists (*28* percent), the 25 potent-strategists (*10* percent), and the 32 low residuals (*13* percent). The low residuals were only used in breaking ties.

Of the 21 games, 14 were encounters between teams with different action style resources, and seven were between teams with the same resources. Nine of the 14 games involved potent-strategist plus strategist teams versus other teams.

Of these, eight games were between potent-strategist teams and strategist teams. It was predicted that the potent-strategist teams would defeat the strategist teams, and this was the case in all eight instances. In a ninth game, a potent-strategist plus strategist team was matched against a residual team and once again, as predicted, the potent-strategist plus strategist team won. Table 2 gives the results. The one-tailed probability for the binomial test for winning the first eight games is .004,

TABLE 2–OUTCOMES FOR POTENT-STRATEGIST + STRATEGIST TEAMS

Game	Net Util Difference	Potent-Strategist + Strategist	Strategist	Potent-Strategist
#1	4,790	Winner	Loser	
#2	4,431	Winner	Loser	
#3	2,400	Winner	Loser	
#4	1,500	Winner	Loser	
#5	1,305	Winner	Loser	
#6	734	Winner	Loser	
#7	610	Winner	Loser	
#8	90	Winner	Loser	
#9	643	Winner		Loser

TABLE 3–OUTCOMES FOR STRATEGIST TEAMS

Game	Net Util Difference	Strategist	Potent-Strategist	Residual
#10	2,793	Winner	Loser	
#11	1,189	Winner	Loser	
#12	335	Winner	Loser	
#13	2,074	Winner		Loser
#14	4,720	Loser		Winner

and the one-tailed probability for winning the nine games is .002. These findings definitely support the hypothesis.

There were three games in which strategist teams played potent teams and here, as predicted, the strategist teams won each time. There were two games in which strategist teams played residual teams. Here it was predicted that the strategist teams would win, but the strategist teams lost one game. Table 3 gives these results. In the five encounters between strategist and lesser teams, the strategists won four times according to the prediction, but lost once with a one-tailed probability for the binomial test of .188.

For the 14 games where the theory predicted the outcome, the results matched the predictions 13 times. This result has a one-tailed probability for the binomial test of .001.

Seven of the games were between teams which were matched for action styles–two potent-strategist games, four strategist games, and one potent game. Here, in order to break these ties, it was held that the presence of a low residual would be detrimental to a team and that the teams possessing one or more would lose to teams lacking such members. In the case of both of the potent-strategist games the results, when this rule was used, did not fit the prediction. It might be argued, however, that the presence of low residuals would mean the least in the case of strong potent + strategist teams. With the four strategist games the rule operated as predicted in three cases and not in one. With the last potent game the rule again operated as predicted. Thus, in four of the seven cases the rule for breaking ties produced the predicted result, but in three of the cases it did not. Table 4 gives the results.

Even if the results of the unsuccessful tie-breaking operation are included, the overall outcomes fitted the predictions. In 17 of the 21 games the outcomes fitted the theory, and in four they did not. This result has a one-tailed probability for the binomial test of .004.

TABLE 4—OUTCOMES FOR MATCHED TEAMS

Game	Net Util Difference	Potent-Strategist + Strategist	Potent-Strategist + Strategist with Residual
#15	8,220	Loser	Winner
#16	943	Loser	Winner
		Strategist	**Strategist with Residual**
#17	3,280	Winner	Loser
#18	2,625	Winner	Loser
#19	2,340	Winner	Loser
#20	980	Loser	Winner
		Potent	**Potent with Residual**
#21	470	Winner	Loser

TABLE 5—OUTCOMES FOR ORGANIZED TEAMS

Game	Net Util Difference	Potent-Strategist + Strategist	Strategist	Potent-Strategist
#1	8,270	Winner	Loser	
#2	6,340	Winner		Loser
#3	2,880	Winner		Loser
#4	2,410	Winner		Loser
#5	270	Loser	Winner	
#6	250	Loser	Winner	

Unquestionably, the sample of games is too small and there were too many ties. Still, the results fitted the predictions.

With the second set of games, the teams were organized in terms of quick predictions. Unfortunately, the sample of six games is altogether too small. In any case, six potent + strategist teams were established on the basis of the pregame data, and three strategist and three potent teams were established to oppose them. It was predicted that the potent + strategist teams would win in every case. Table 5 shows the outcomes.

Table 5 shows that the three encounters between potent-strategist + strategist teams and potent-strategist teams resulted in wins for the former and losses for the latter. This outcome fits the prediction. The power differences between potent-strategist + strategist teams and strategist teams are not so great, and here the prediction that the potent-strategist + strategist teams would win held in one case and not in two cases. Note, however, that the net util differences with the two games which did not fit the prediction were small. This sample of games is too small, but the results present a pattern which, while nonsignificant, clearly lies in the predicted directions.

If the same postgame questionnaire is used, then the results are less interesting inasmuch as three games fitted the prediction and three did not. If the differences between the two sets of games are ignored and these results are combined, there were 27 games with a total of seven which did not fit the predicted pattern—a one-tailed binomial test probability of .02. For the potent-strategist + strategists alone, however, there were 15 games between teams with different resources, and three of these were losses—with a one-tailed probability for the binomial test of .018.

The foregoing analysis has been based on encounters between one team and another in a single game, but it is obvious that the different types of teams can be listed in an ordinal scale in terms of predicted likelihood of success, i.e., Potent-Strategist + Strategist > Strategist > Potent-Strategist > Residual. If this ordinal scale is associated with the two-valued ordinal scale of winning > losing with the 14 games where teams of different scale types played each other, the Goodman-Kruskal coefficient of ordinal association is +.852 ($Z=3.256$, $p<.01$ two-tailed). It is possible however to group the 28 teams into quartiles on the basis of their net util difference scores (see table 6). Since there were no ties in net util differences, it is easy to regard the entire 28 team series as a 28 element ordinal scale. When this is done, $G=+.498$, $Z=2.803$, $p<.01$ two-tailed. It is very clear, then, that the ordinal scale of team types is positively associated with the ordinal scale of net util differences.

When the tie-breaking rules are added, a seven element ordinal scale is created: Potent-Strategist + Strategist > Potent-Strategist + Strategist + Residual > Strategist > Strategist + Residual > Potent-Strategist > Potent-Strategist + Residual > Residual. When this ordinal scale is associated with the two-valued ordinal scale of winning and

TABLE 6—UTIL DIFFERENCES AND TEAM SCALE TYPES

Util Differences	Team Scale Types: Potent-Strategist + Strategist	Strategist	Potent-Strategist	Residual
+4,790 to +1,500	4	2	0	1
+1,305 to +90	5	2	0	0
-90 to -1,305	0	4	3	0
-1,500 to -4,790	0	4	1	2

N=28, G=+.622, Z=2.911, p<01 two-tailed

TABLE 7—UTIL DIFFERENCES AND TEAM SCALE TYPES

Util Differences	Team Scale Types: Potent-Strategist + Strategist	Potent-Strategist + Strategist + Residual	Strategist	Strategist + Residual	Potent-Strategist	Potent-Strategist + Residual	Residual
+8,220 to +2,625	2	1	3	0	0	0	1
+2,400 to + 980	3	0	4	0	0	0	0
+ 943 to + 90	4	1	1	0	1	0	0
- 90 to - 943	1	0	3	0	2	1	0
- 980 to - 2,400	0	0	4	1	1	0	1
- 2,625 to - 8,220	1	0	3	2	1	0	0

N=42, G=+.343, Z=2.164, p<.05 two-tailed

TABLE 8—UTIL DIFFERENCES AND TEAM SCALE TYPES: SIX GAME STUDY

Net Util Differences	Potent-Strategist + Strategist	Strategist	Potent-Strategist
+8,270 to +2,880	3	0	0
+2,410 to + 250	1	2	0
- 250 to - 2,410	2	0	1
- 2,880 to - 8,270	0	1	2

N=12, G=+.744, Z=2.170, $p < .05$ two-tailed

losing, the Goodman-Kruskal coefficient of ordinal association is +.675 (Z=2.974, $p < .01$, two-tailed). Table 7 gives a distribution when the team type scale is compared with a util difference scale. When the util difference scale is treated as 42 rank scale, it can be compared with the seven rank team scale type scale and here G=+.2756, Z=2.014, $p < .05$, two-tailed.

If the smaller series of games is considered, there is no significant association between the three-class ordinal scale of team type (potent-strategist + strategist > strategist > potent-strategist) and the simple winning-losing scale. If, however, the 12 teams are ranked in terms of net util difference, the 12-element util difference scale is positively associated with the three-class team type scale with G=+.689 (N=12, Z=2.310, $p < .05$ two-tailed). Table 8 shows the distribution when the 12 teams are divided into quartiles in terms of net util differences. Note that the association between the two ordinal scales is significant and substantial. Even with the lesser study, then, the predicted association held even though the sample was too small to permit a significant treatment of simple winning and losing.

The above analysis suggests that the scale of team types does have validity and that the order of the scale types is meaningful. This circumstance will permit a more fine-grained analysis beyond simple winning or losing in the future.

It has already been mentioned that a secondary analysis was made of the results obtained by Robinson in administering the "Job Analysis and Interest Measurement Test" designed by Walther.[20] The use of this test is reported more fully in the article cited as well as in earlier works by Walther.[21] Two hundred respondents coded for action styles also provided this personality information. When the potent-strategists were compared with all other respondents, they differed significantly from all other respondents in a number of ways. (See table 9.) Table 9 shows that the potent-strategists were distinctive as compared with all of the others with 11 of the 28 scales. Two of the 11, however, namely the low systematic-methodical and self-assertive scores, did not fit the impressions gained of the potent-strategist, but the other nine seem to make sense. The reader, however, is cautioned not to give the above results much weight for the authors are not competent to interpret such data. The results are listed simply to show that potent-strategists may be different.

The strategists did not have such a distinctive profile. They scored below the average scores of other groups at a significant level for: Trusting-Even-Tempered: The degree to which the individual trusts others and maintains an even temper, and Social Service: The degree to which the individual values himself by contributing to social improvement. Both of these findings fit the impressions of the authors.

The high residuals scored significantly above the mean on "plan ahead," "systematic methodical" and "supportive of others," and below the mean on "concrete-practical" "accept rou-

TABLE 9—JOB ANALYSIS AND INTEREST MEASUREMENT TEST RESULTS FOR POTENT-STRATEGISTS

A. Potent-Strategists had mean scores which were significantly lower then those of the others in the following categories:
   1. Systematic-methodical: The degree to which the individual uses step-by-step methods for processing information and reaching decisions.
   2. Self-Assertive: The degree to which the individual likes competition and tends to pursue his own goals when they are in competition with others.
   3. Move toward Aggressor: The degree to which the individual tries to "pour oil on troubled waters" when someone acts toward him in a belligerent or aggressive manner.
   4. Motivate by Results: The degree to which the individual believes that people are best motivated by the chance to accomplish something (intrinsic motivation).
   5. Intellectual Achievement: The degree to which the individual values himself through his intellectual attainments.

B. Potent-Strategists had mean scores which were significantly *higher* than those of the others in the following categories:
   1. Cautiousness: The degree to which the individual is cautious, plays it safe, and does not like being differant from others.
   2. Concrete-Practicel: The degree to which the individual considers himself as prectical, sensible with both feet on the ground in contrast to being imaginative, ingenious, and having novel idees.
   3. Likes Structure: The degree to which the individual likes schedules, believes in moral absolutes, end does not like unplanned activities or doing things in an unconventional way.
   4. Mechanical Activities: The degree to which the individuel likes machanical activities.
   5. Accept Routines: The degree to which the individual likes to have definite procedures available which he can follow.
   6. Directive-Controlling: The degree to which the individual believes that an executive gets the best results by making decisions himself and that most people require external controls.

tines" and "authority identification." The intermediate residuals were significantly below the mean on "likes structure," "self-assertive," "supportive of others," "accept routines," "group participation," "directive-controlling," while they were above the mean on "motivate by rewards." Finally, the low residuals were significantly below the mean on "plan ahead," "systematic-methodical," "orderliness-perseverance," and "intellectual achievement," and significantly above the mean on "accept routines" and "approval from others."

The various action style types seem to have some meaning in terms of other personality variables. The potent-strategist, in particular, is distinctive on these scales. The strategist, however, is not clearly defined although there may be an indication of the Machiavellian character which he probably possesses. High, intermediate, and low residuals may be distinctive. The low residuals are particularly interesting.

Discussion. It would appear that action styles have weight in situations where intelligence and competence are roughly equivalent. The styles themselves, however, are only estimates of "ways of behaving" in action situations—they are not the products of careful personality analysis. However, in many action situations the resources, competence of the investigations, and time available do not permit the systematic treatment of personalities, and only rough and rapid estimates can serve a useful purpose. At best, then, the action style categorization represents only an approximation of a complex multivariant situation.

In a metaphorical sense, the action styles resemble dexterity. Thus the potent-strategist may be considered right-handed and the strategist left-handed, but right-handed persons make good use of their left hands just as left-handed people use their right hands. Some people are ambidextrous. Usually individuals have preferred action styles, but it may also be the case that some people are facile with more than one action style. This must be studied in the future.

In the real world a single individual may bear all of the responsibility for a decision, but even such a decisionmaker may arrive at his decisions through dyadic discussion or other small group interaction. To the anthropologist, at least, it is not surprising that successful dyads or small groups possess a mixture of action styles, for the strong chief with crafty advisers or the crafty chief with strong advisers appear often enough in the literature. The potent-strategist king with the strategist adviser is a familiar combination. Some fundamental units of social organization such as the nuclear family may represent a profitable mixture of action styles (in our society, for example, the potent-strategist husband with a strategist wife may be a successful combination and vice versa). If the most effective decisionmaking groups were identified in the real world, they might well possess a mixture of action styles.

Many decisions, of course, are made in stratified contexts, particularly in military organizations. It did not appear to be the case that rank made a difference within the artificial world of a TEMPO game, but surely differences in power and authority carry weight in real group decisions. Observation of part of a war game played by actual fleet officers showed that information flow is restricted by differences in ranks, but that informal channels of communication exist which bypass formal lines of information flow. One junior officer, who was classified as a strategist on an impressionistic basis, managed to communicate with the most senior officer (who was classified as a potent-strategist on an impressionistic basis) by giving his views to an intermediate figure who then relayed the information to the senior officer. This incident proves nothing, but it may be possible for potent-strategists and strategists to cooperate in the presence of some formal barriers to communication.

In general then, the present research would indicate that mixed styles are most effective. If there is no mixture, then the style of the strategist is more effective than that of the potent-strategist in strategic situations. Finally, having a clearly-defined action style, no matter what, is probably more effective

BIOGRAPHIC SUMMARIES

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than having none at all. Perhaps, to some readers at least, this formulation will make intuitive sense.

If this loose and preliminary formulation, however, has some validity, then one can ask if the mixture of decision-making styles is preserved in important groups. If, for example, the achievement pattern is so structured that only potent-strategists get to the top of the ladder, then groups of decisionmakers at the top which are composed only of potent-strategists may not be terribly effective. Important decisionmaking groups should have means for the recruitment of members with a variety of action styles, although it can be argued that the overriding decisions should be in the hands of the potent-strategists.

All of the foregoing is speculative. There is a great need for further research, and indeed such research is already under way. The present study, however, is not as much as a presentation of conclusive findings as it is a stimulus to somewhat different thinking in this important area of decision-making.

FOOTNOTES

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12. Cf. Roberts and Sutton-Smith, "Child Training and Game Involvement"; Roberts and Ridgeway; and Roberts and Forman.
13. Roberts and Sutton-Smith, "Child Training and Game Involvement."
14. Roberts and Ridgeway; Roberts and Forman.
15. Roberts and Ridgeway, p. 229.
16. Cf. Sutton-Smith and Roberts, "Rubrics of Competitive Behavior."

17. Cf. Roberts and Koenig.

18. The TEMPO game was developed by H. Hatry, F. Jackson, and P. Lever of TEMPO's Economic Analysis Section and is fully described in SP-174, May 1962, TEMPO, General Electric Co., Santa Barbara, Calif.

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Ψ

Management is now where the medical profession was when it decided that working in a drug store was not sufficient training to become a doctor.

Lawrence Appley, President, American Management Association, Men at the Top, 1959