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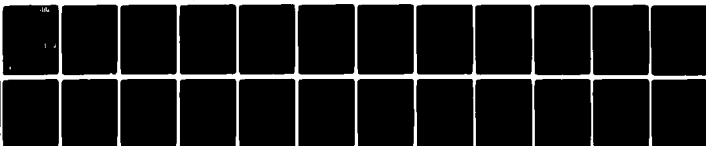
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FEB 81 S STREUFERT, S C STREUFERT, D M GORSON N00014-80-C-0581

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS ON COMPLETING FORM
1. REPORT NUMBER TR #2	2. GOVT ACCESSION NO. AD-A095969	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) TIME URGENCY, LOAD AND MANAGERIAL DECISION MAKING		5. TYPE OF REPORT & PERIOD COVERED N/A
7. AUTHOR(s) Siegfried/Streufert, Ph.D. Susan C./Streufert, Ph.D. David M./Gorson		6. PERFORMING ORG. REPORT NUMBER 1-1762
9. PERFORMING ORGANIZATION NAME AND ADDRESS The Milton S. Hershey Medical Center Department of Behavioral Science 500 University Drive Hershey, PA 17033		8. CONTRACT OR GRANT NUMBER(s) N00014-80-C-0581
11. CONTROLLING OFFICE NAME AND ADDRESS Office of Naval Research Code 452 Quincy Street Arlington, VA 22217		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NR170-99
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE Feb 1981
		13. NUMBER OF PAGES 24
		15. SECURITY CLASS. (of this report)
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) DTIC ELECTE S MAR 4 1981 D		
18. SUPPLEMENTARY NOTES B		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) coronary prone behavior, decision making, heart disease, information load, input, output, managers, planning, problem solving, retaliatory behavior, simulation, strategy, time urgency, Type A		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Previous research has demonstrated that optimal complex managerial decision making tends to occur at intermediate information load stressor levels. The present research considers time urgency as an additional variable. Time urgency has been shown to be relatively common among managers (as part of the Type A Coronary Prone Behavior Pattern). Many managers believe that their time urgent stylistics are necessary to guarantee success at their jobs. Since urgency requires rapid responding, it may,		

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however, be viewed as an additional stressor. The latter conceptualization would predict decrements in complex and improvements in simple performance. Experimentally induced time urgency was utilized to determine the effects of urgency on three measures of managerial performance. It was found that time urgency interacts with information load to produce performance outcome. Moderately complex planning and decision making was found to be optimal at intermediate load levels, but disintegrated when time urgency increased to high levels. Similar results were obtained for long-term complex planning. Simple retaliatory decision making increased with load. Higher levels of time urgency resulted in greater retaliatory activity. It is concluded that managerial activities which require complex decision making and long term future planning are hindered rather than aided by time urgency.

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Time Urgency, Load and Managerial Decision Making

Siegfried Streufert, Susan C. Streufert and David M. Gorson

The Pennsylvania State University College of Medicine

Hershey, Pennsylvania

In the late 1950s, Friedman and Rosenman identified a group of behavior patterns that appear to be more common among persons afflicted with coronary heart disease than among those who remain healthy. Labeled Type A Coronary Prone Behavior, this pattern includes such characteristics as time urgency, hostility, getting involved in multiple activities simultaneously, and a competitive need to achieve.

Since its inception (Friedman and Rosenman, 1959), the concept of a behavioral risk factor for coronary disease has generated a large amount of research. In early studies, Friedman and Rosenman demonstrated that 28% of men with Type A characteristics fell victim to heart disease, while only 4% of Type B men (the category in which the above behaviors are generally absent) were afflicted. It was shown that Type A women had four times the incidence of coronary disease when compared to Type B women (Rosenman and Friedman, 1961). Extensive prospective epidemiological studies such as the Western Collaborative Group Study (e.g., Rosenman, Friedman, Straus, Jenkins, Zyzanski and Wurm, 1970) have supported the importance of behavioral style as an antecedent of heart disease, independent of other risk factors.

Coronary prone behaviors are apparently not only a function of interpersonal stylistic differences; they are also affected by situational

variation. The extensive efforts of Dembroski and associates have shown that coronary prone behavior is particularly evident upon challenge (e.g., Dembroski, MacDougall, and Shields, 1977) producing considerably elevated levels of physiological arousal in persons who are classified as Type A [via the Structured Interview method developed by Rosenman (1978)]. Perception of challenge in persons identified as Type A does not only produce specific behaviors and arousal, but it also alters body chemistry. For example, Glass, Krakoff, Continda, Hilton, Kehoe, Mannucci, Collins, Snow, and Elting (1980) have shown that challenged Type A subjects demonstrated considerably higher plasma epinephrine levels than Type B subjects. In an evaluation of the large volume of research on Type A coronary prone behavior, a conference of experts assembled by NIH in 1979 concluded that coronary prone behavior is a risk factor for heart disease. The degree of risk is approximately the same as that associated with hypertension and elevated serum cholesterol.

Time Urgency, Societal Demand, and Success

One of the central components of Type A coronary prone behavior is time urgency. Persons identified as Type A often impose unnecessary deadlines on themselves, feel that they are not getting enough done, and/or work on several tasks simultaneously in order to accomplish more. It is likely that the urgency of activity in Type A persons reflects a response style for coping with threats to a sense of environmental mastery of control (Matthews, Glass, Rosenman, and Bortner, 1977; Glass, 1977). Accomplishing more in less time would, in the view of the Type A individual, make her or him a more successful person.

There is little question that society encourages time urgent behavior. In a recent widely shown television commercial, an investment company praises its brokers and "demonstrates" their competence by showing a broker rushing out in the dark early morning hours to get needed information from European money markets, staying ahead of the others. Obviously, or so the commercial implies, this information will allow the broker to make better decisions than his less-time-urgent competitors can. This ad is only one example of the many communications indigenous to western culture that emphasize the supposed importance and value of time urgency.

We may ask whether time urgency is, indeed, as necessary an ingredient for success as society appears to suggest. Certainly those who have engaged in such a behavioral style and have gained some level of success (whether or not that success is related to these stylistics) would believe that their time urgent behavior allowed them to succeed: success does act as a reinforcer. Of course, some tasks require rapid and multiple behaviors under time restrictions. Yet other tasks may not.¹ Particularly decision making (as opposed to problem solving) tasks may be less suited to time urgency: for example, middle or high level managers, if they are to be successful, need long-range rather than short-range perspectives (c.f., Jaques, 1978). In addition, time urgency which results in translation of information received into rapid decision making output may result in cognitive overload. Streufert and associates (e.g., Streufert and

Schroder, 1965) have shown that such an overload is seriously detrimental to the kind of complex decision making that is required for successful high level managers (Jaques, 1968, 1977). In other words, time urgency may - in contrast to belief - be detrimental rather than advantageous for at least some groups of persons, e.g., responsible managers in the private and public sectors of society. Yet, as one might expect, it is particularly the successful (i.e., reinforced) group of managers which tend to believe that time urgent behavior is a necessary ingredient in their success. Because of prior learning (see below) and rewards received while engaging in hostile, achievement-oriented and time urgent behavior (c.f., Roskies, in press), these behavioral styles become firmly established in managers. As a result, Type A behavior is particularly common among this group of persons (Howard, Cunningham and Rechnitzer, 1976) and the rewards which have been apparently gained because of the unhealthy time urgent life style would make these managers particularly resistant to change (Mettlin, 1976). Unfortunately, there has so far been no conclusive evidence that a non-urgent life style may be as, or more, appropriate to the kind of decision-making tasks in which managers must engage.

The research reported in this paper seeks to establish how complex decision making behavior, i.e., behavior which is identical or similar to the performance demanded of middle and upper level managers, is jointly affected by information load and by urgency of responding. Previous research of Streufert and associates has shown that load has a major impact on executive decision making (c.f., Streufert, 1978).

Further, load can be considered a stressor which is likely to interact with other stressors (such as time urgency) to produce specific outcomes in managerial functioning. As stated above, we know much less about the potential advantageous or detrimental effects of urgency on complex decision making and long-range planning activities. This paper explores the effects of urgency and interactions with load. To avoid the bias introduced by persons who are already typically behaving in a time-urgent fashion, the population sample selected as subjects for this research was not taken from managerial personnel, but from adults attending university classes, i.e., a group of sufficiently high intelligence. Further, rather than comparing time urgent (Type A) vs. non-time urgent (Type B) persons, it was decided to induce time urgency experimentally to produce immediate responding. The effects of experimentally induced urgency levels on the kind of decision making expected from managers is measured.

METHOD

Subjects

Eighty paid adult male volunteers from a state university were randomly assembled into twenty four-man decision making groups. The subjects participated in the research for a period of ten consecutive hours. In addition to a standard hourly rate of compensation, they were told that they would "win" another four dollars if they would do well in the simulation "game" in which they were to participate. Progress and outcome of that game were, in part, determined by a program and all participants received the four-dollar bonus.

The Environment

Groups of subjects participated in the Tactical and Negotiations Game (TNG), an experimental simulation.² For a description of experimental simulation methodology, the interested reader is referred to Fromkin and Streufert (1976) and Streufert and Suedfeld (1977). Each of the four-man decision-making teams was given the task of directing the economic, intelligence, military, and negotiation activities of a small developing nation called Shamba which was plagued by an internal revolution. Subjects initially read a manual on the historical and economic characteristics of the nation, its present military, economic, and negotiation (international) status and its current problems. Further, participants were informed about latitudes and limitations of their potential actions, about the resources available to them, and about the operation of the simulation technology as it would affect them. They were told that they would be able to make any number of any kind of decisions through the game as long as they would not overspend their resources. Their decisions were to be recorded on special forms and communicated to the experimenters. Participant teams would play the TNG against a program for a number of periods of indeterminate length until the Shamba conflict was resolved in some fashion.

After spending two hours reading the manual on Shamba and listening to a 30-minute tape providing more detailed familiarity

with the simulation environment, the TNG was begun. The simulation was divided into ten 30-minute playing periods, separated from each other by short intermission periods. Intermissions were used, in part, to collect paper-and-pencil scale data.

The first 30-minute playing period of the TNG was used to familiarize the participants with the simulation setting. During this period, the participants received ten messages (an optimal amount of information according to previous research by Streufert and associates; e.g., Streufert and Schroder, 1965). One of the messages was marked URGENT (see below). After completing their first playing period, the participants were given the opportunity to ask additional questions about the game and were provided with food and soft drinks. Although data collection proceeded during this first period as in all future playing periods, the first period was considered a warm-up and the data were not utilized for analysis.

The first playing period was followed by nine additional periods of play. During three of these periods, the participants received six, during three other periods ten, and during the remaining three periods fourteen information messages (information load levels 6, 10 and 14). Each message was simple, consisting of a subject-predicate-object statement. The purpose of this simplicity was to assure that a message would not carry obvious secondary implications. For example, one message stated, "The opponent has invested 20 Million in steel mill construction." Messages were essentially pre-programmed. Twenty-five

percent of the messages were concerned with economic, twenty-five with negotiation, twenty-five with military, and twenty-five percent with intelligence events. Order of messages and event areas were randomized. As in previous runs of the TNG, manipulation checks indicated that the participants considered the events to be due to their own previous or to their (simulated) opponents' decisions in more than 80% of the cases.

In addition to information load, urgency was manipulated. Participants were informed at the beginning of the TNG that messages marked URGENT required immediate responding, and that a response latency of more than one minute would most likely lead to failure. The participants did indeed respond rapidly to urgent messages: 93% of such messages yielded a response within one minute and another 4% produced responses in the second minute after receipt of the message.

Either zero, two (low urgency) or six (high urgency) messages received by participants during any single playing period were marked URGENT. All load conditions were paired with all urgency conditions. Absence of urgency (urgency level zero at loads 6, 10 and 14) was viewed as a control condition for comparison with previous data obtained in experiments where load alone was manipulated. It should be noted that an urgency level of six urgent messages under low load conditions (load 6) produced a situation where all messages received during that period of play required immediate response. The specific playing periods reflecting nine different urgency/load combinations following the first (warm-up) period of play were presented to each of the 20 teams in different random order.

Data Collection

As in previous research by Streufert and associates, the decisions made by the groups of participants were used as the basis for data analysis. A decision matrix was constructed with type of decision listed vertically (listings varied from group to group depending on the kinds of decisions made by that group) and time indicated horizontally. In this matrix, each decision is represented by a point vertically beneath the point in time at which the decision was made and horizontally beside the type of decision represented. Repetitive decisions were connected with horizontal lines and simultaneous, but different, decisions with vertical lines. Decisions made to provide the basis for future, different decisions (for example, the investment of funds to gain population support in an area where the later construction of an industrial facility was planned) were connected with forward-directed diagonal arrows to the pre-planned later decision. Utilizing a previous decision for present purposes, where the earlier decision was not made with the present decision in mind, was indicated by a backward diagonal arrow. Matrices constructed for each of the 20 decision-making teams were analyzed according to scoring procedures derived by Castore and Streufert (1967) to produce independent measures of group decision making. Measures obtained were:

- (1) Number of Integrations, a measure counting the diagonal arrows in the decision matrix initiated (in either forward or backward direction) during any one playing period (i.e., during the time one particular load/urgency pair manipulation was in effect).

This measure reflects the general tendency of a decision-making team to act (or plan) strategically at low or moderate levels.

(2) Quality of Integrated Strategies (QIS). This measure is sensitive to the length (over time) of complex strategic planning and to the complexity of the strategies that are carried out over time. It is calculated as:

$$QIS = \sum_{1}^P W (1 + n_p + n_f)$$

Where W represents the length of the time dimension of any forward diagonal between the points in time it connects,

n_p is the number of other forward diagonals connecting to the beginning point of the diagonal in question, and

n_f is the number of other forward diagonals connecting to the end point of the diagonal in question.³

All scores for all forward diagonals initiated during a playing period are summed to obtain a QIS value.

(3) Number of Retaliatory Decisions. This measure is concerned with rapid respondent unstrategic decision making. It counts the number of decisions made during any one playing period which (a) are made in response to incoming information, (b) are not connected by any diagonal to another previous or future decision, and (c) reflect decisions made rapidly after receipt of incoming information, i.e., within three minutes.

While the Number of Integrations in decision making and QIS are measures designed to obtain estimates of moderate and high levels of managerial strategic planning and functioning, respectively, retaliatory decision making reflects actions that tend to occur more often (and more appropriately) below managerial levels (c.f., Jaques, 1978).

RESULTS AND DISCUSSION

The data were analyzed with three separate analysis of variance procedures for (1) Number of Integrations, (2) Quality of Integrated Strategies (QIS), and (3) Number of Retaliatory Decisions. All ANOVAs utilized entirely within procedures with two factors each: Load (three levels) and Urgency (three levels). A combined analysis was not utilized since the dependent variable data sets are metrically not comparable (two of them are simple counts, the third is based on a multiplicative function). Each of the data sets will be described and interpreted in turn.

(1) Number of Integrations

Previous research (see for example Streufert, 1970) has shown number of integrations (a measure of moderately complex planning and decision making) to be a reliable U-shaped function of information load. A load of ten items of information per 30-minute period has typically produced an optimal number of integrations. The analysis of variance main effect for load replicates these previous findings ($F = 25.92$, $2/38$ df, $p < .0001$). The greatest number of integrated decisions occurred at load 10, with fewer integrated decisions during the lower load level (6 informative items per half hour) and the higher load level (14 informative items per half hour) periods. A significant main effect was also obtained for urgency ($F = 7.23$, $2/38$ df, $p < .005$). The data show that more integrated decisions were made when urgency levels were low (two messages per 30-minute playing period marked urgent) or when urgency was absent (no urgent messages during the playing period, a form of control condition equivalent to previous research where only load was manipulated, e.g., Schroder and Streufert, 1965). High urgency levels (six urgent messages per playing period) resulted in a considerable decrease in the number of integrated decisions.

The interaction of load and urgency also produced a significant F ratio ($F = 7.95$, $4/76$ df, $p < .0001$). The interaction is shown in Figure 1.

INSERT FIGURE 1 ABOUT HERE

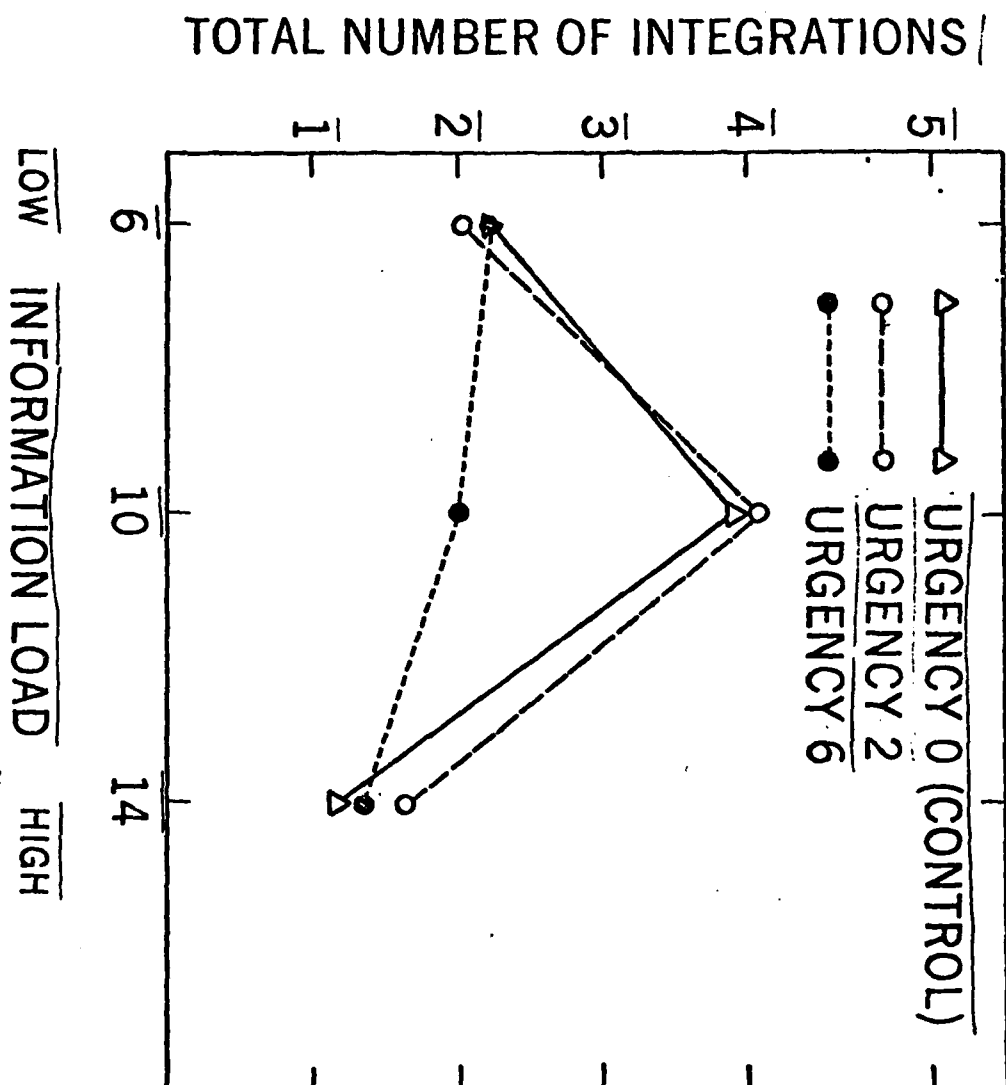


FIGURE 1. Effects of information load and time urgency on total number of integrations, a measure of moderately complex planning and decision making.

A view of the figure clearly shows that low urgency or absence of urgency results in the typical U-shaped curve that has been replicated in several studies for load manipulation effects on number of integrations. A considerable number of urgent messages received by the decision-making group, however, destroys that effect: the optimality of intermediate load levels is eliminated and a relatively linear effect is obtained. The data suggest that a greater number of urgent messages may make it difficult or impossible for the decision maker to integrate, i.e., to plan for the future, even at relatively moderate load levels.

(2) Quality of Integrated Strategies

The QIS measure is based on integrations and their multiple interrelationships; in other words, it reflects long-term complex planning for the future. Since it appears that higher urgency levels seriously affect the capacity of decision makers to integrate at all, we might expect that QIS would be similarly affected. One may, however, wonder whether the lower urgency levels (here, two urgent messages per half hour) would have detrimental effects in comparison to the absence of urgency altogether. The data analysis for QIS produced a significant main effect for information load ($F = 43.89$, $2/38$ df, $p < .0001$). Optimal long-term planning performance was obtained under intermediate load conditions. QIS values for load levels below and above the optimal load value are approximately equivalent. A significant main effect for urgency ($F = 35.26$, $2/38$ df, $p < .0001$) was obtained as well. Again, high urgency resulted in generally low performance, with higher QIS values obtained for low

urgency or absence of urgency. A significant load X urgency interaction effect is shown in Figure 2. A significant rise in QIS ($F = 15.19$,

INSERT FIGURE 2 ABOUT HERE

$4/76$ df, $p < .0001$) was obtained at intermediate load levels only when urgency was low or absent. A trend toward higher QIS levels at optimal loads under high urgency conditions remained far from significant. However, a slightly lower value ($p < .05$) was obtained for conditions where urgency was low (two urgent messages per 30 minutes) in comparison to conditions where participants experienced no urgency whatsoever.

In general, then, the results obtained in the Quality of Integrated Strategies analysis are quite similar to the data obtained for Number of Integrations. Urgency appears generally detrimental when it reaches higher levels. In addition, there appears to be a slight negative effect of even low urgency levels on the long-term strategic (complex) planning reflected by the QIS measure. However, this negative effect does not reach the proportions of those negative effects that are obtained at higher urgency levels.

(3) Number of Retaliatory Decisions

Previous research (e.g., Streufert, Driver and Haun, 1967) has shown that retaliatory decision making tends to increase as strategic decision making decreases with increasing load levels. If that effect is replicated in this research, we should expect relatively linear increases of retaliatory decision making with increasing load. The obtained main effect for load ($F = 40.81$, $2/38$ df, $p < .0001$) bears out that prediction: increases in load result in a linear increase in

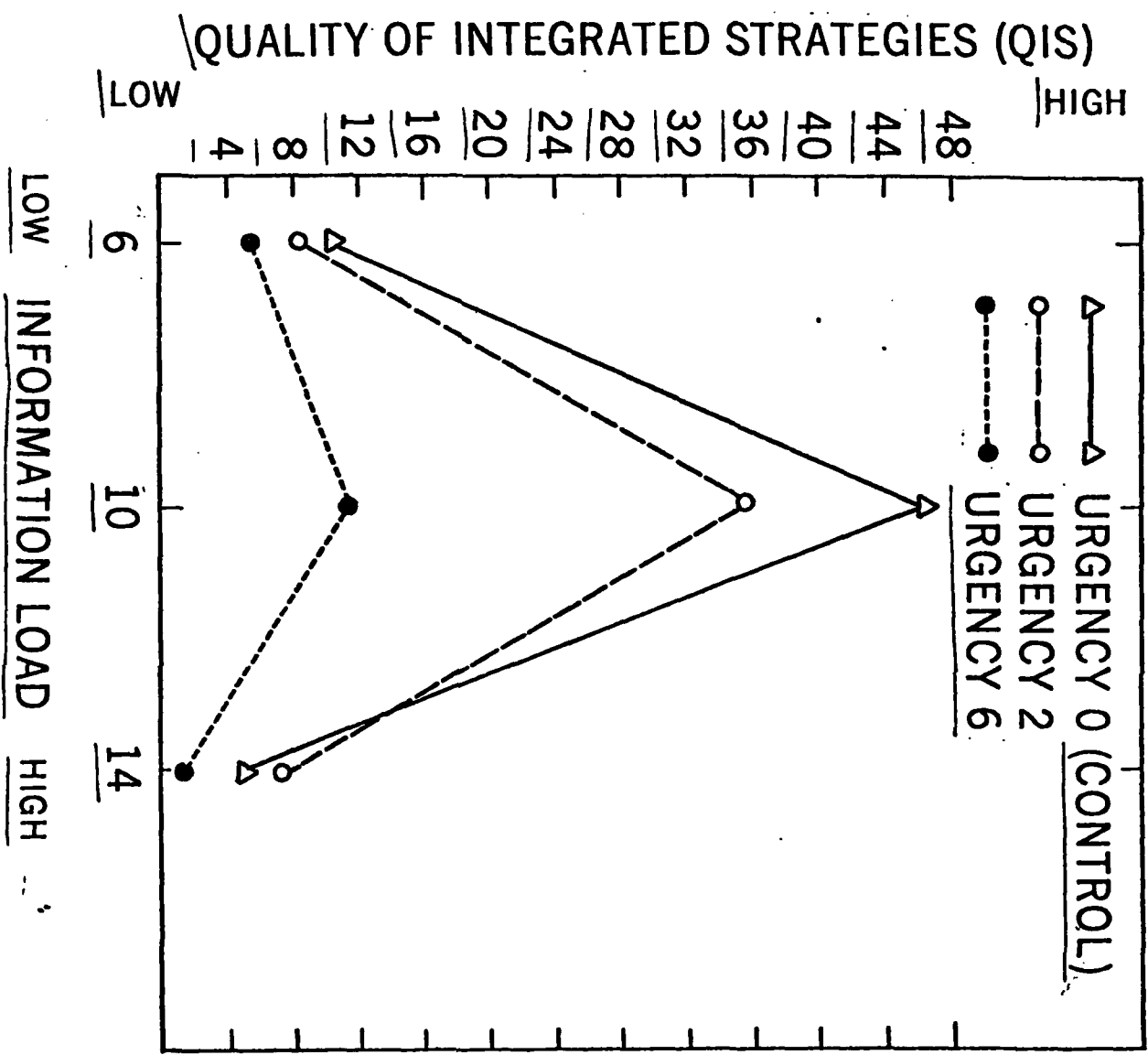


FIGURE 2. Effects of information load and time urgency on the quality of integrated strategies, a measure of long term strategic planning.

retaliatory decisions. The main effect for urgency is significant as well ($F = 57.96$, $2/38$ df, $p < .0001$). The greatest number of retaliatory decisions were made under conditions when urgency was high (six urgent messages) followed by low urgency levels ($p < .01$ for that discrepancy). The lowest number of retaliatory decisions were produced when urgency was entirely absent ($p < .05$ for the discrepancy between absent and low urgency).

The interaction effect of load and urgency is shown in Figure 3.

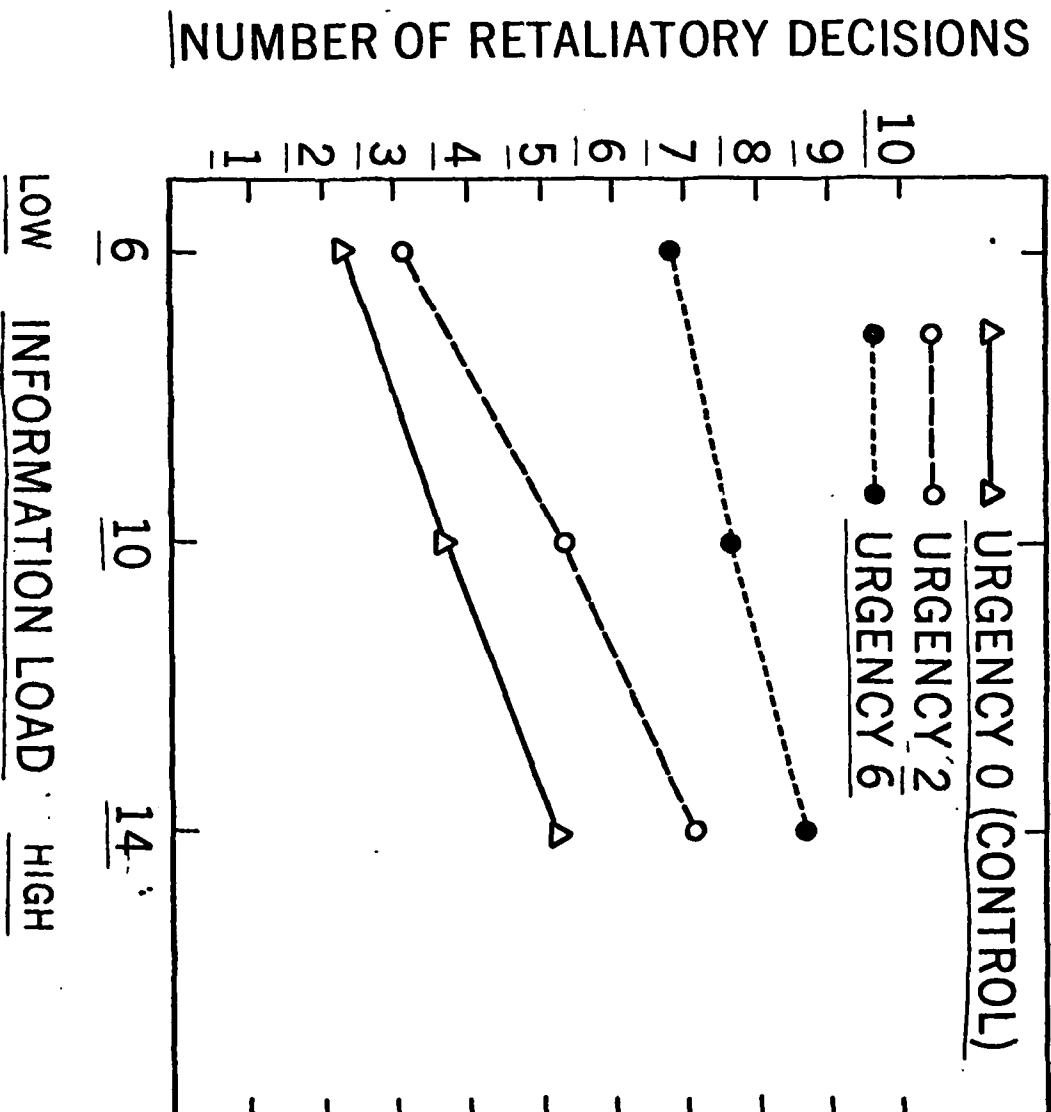
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A significant F ratio of 3.40 with 4 and 76 degrees of freedom was obtained ($p < .05$). That significance is produced by a slightly greater slope in the increase of retaliatory decisions for low urgency levels as compared to high urgency or absence of urgency with increasing load. While that difference is not great, it suggests that low urgency levels may not be as detrimental (i.e., produce more retaliatory decisions) when load is low as they are when load is high. With high load levels, the number of retaliatory decisions made by decision makers approaches that obtained from high urgency conditions, while under low load levels, low urgency and absence of urgency are quite similar in their effects.

Urgency and the Managerial Task

It is clear that both load and urgency have specific and interactive effects on the complex decision making characteristics that are important to managerial decision making. However, before too far reaching implications are drawn from the present data, a few words of caution may be in order. First, we are speaking of integrations

FIGURE 3. Effects of information load and time urgency on retaliatory decisions, a measure of simple respondent decision making behavior.



and of Quality of Integrated Strategies, measures of moderately complex planning or long-term complex strategic planning for the future, as important characteristics of managerial functioning. In turn, retaliatory responding may be seen as the opposite: as too rapid and, consequently, less appropriate managerial behavior. While this may be true in most cases, it is not true in all situations. There are times in managerial activities where decisions must be made immediately and without regard for future consequences. Whenever such events occur, taking a long-range view of one's plans may not be necessarily appropriate. Unfortunately, however, a demand for immediate action (as in this simulation) is often taken as a demand for a single unrelated action without considering future consequences, even if that is possible in the time allowed. However, when strategic behavior is important (and it is indeed for most moderate or high level managerial decision making activities), then (and only then) leaving a retaliatory decision as an isolated fragment of action appears quite inappropriate. A second concern might be expressed as well. As seen in these data (and previous research by Streufert and associates), optimal strategic (planning or long-range planning) behavior occurs only when information load levels are appropriate (intermediate). As has been shown, urgency effects on integrative decision making and on the Quality of Integrated Strategies are greatest when information loads are optimal. Interpretation of the effects of urgency on decision making must then be restricted to appropriate (and optimal) load conditions.

Urgency and Coronary Prone Behavior

As stated above, the Type A individual often states that time urgency is a necessary ingredient to his or her successful functioning. Managers are no exception to this rule; as a matter of fact, one hears this argument probably more often from managers than from any other single group. Yet, as we have discussed above, it is in particular the manager at medium or upper levels who must be able to engage in long-range strategic planning with considerable frequency (Jaques, 1978; Streufert and Streufert, 1978). We have known from previous research of Streufert and associates that this form of planning is possible only when information load is optimal. Frequently, managers are able to create loads that produce just those optimal conditions, e.g., via delegation of responsibility or even by letting the executive secretary function as a barrier between his/her boss and the social as well as non-social information directed toward the boss. However, the manager typically is unable to manipulate urgency: as many researchers concerned with coronary prone behavior have shown, urgency (together with other related behaviors) is a style which is pervasive and relatively resistant to change. The data obtained in this research would suggest, then, that managers who are time urgent would be less likely to engage in either short or long-range (complex) strategic planning behaviors. If Jaques' (1978) assessment of management in some twenty countries is accurate, this would suggest that the time urgent manager would also be less likely to obtain or retain management positions at the highest executive levels, where a very long-time perspective is needed. The informal observation by some

executives that their peers at the highest executive rungs are not often Type As would corroborate such a conclusion.

As an addendum to this data interpretation, one may suggest that those who attempt to modify the behavior of Type A managers in the direction of a less time-urgent orientation might find these data useful or at least suggestive. The Type A manager may not want to recognize that time urgency and related stylistics of coronary prone behavior may increase his or her risk of coronary disease. There is no evidence - except for some statement of statistical probability - that he or she will personally experience heart disease. Presenting the manager with experimental evidence that urgency is not necessarily beneficial to a high level of managerial performance may, on the other hand, have more of an effect. It is, after all, the belief that urgency results in success that - at least in part - appears to motivate the manager to maintain his or her coronary prone life style.

FOOTNOTES

¹It is interesting to note that since the time frames of lower level managers are shorter than those of older managers, the urgency-based success of younger executives at lower corporate levels operates as a training device to create true urgent stylistics.

²In contrast to standard "free" simulation techniques, the experimental simulation permits continuous experimental control over events represented by the independent variable (Straufert, Kliger, Castore, and Driver, 1967).

³The number of diagonals connecting to the beginning or end point of the diagonal in question includes all forward diagonals linked in chain sequences. For example, if a strategic decision sequence represented by a diagonal is part of a chain of seven decisions in time sequence, then all seven diagonals and other diagonals connected to their beginning and end points would be included.

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