

Managerial Response to Environmentally Induced Stress¹

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Results of a test of managerial response to environmentally induced stress indicated that locus of control was highly related to perception of stress in the environment and the use of decision or coping behaviors. Performance was significantly related to the use of task-oriented coping behaviors. Implications for decision theory and the management of stress are discussed.

There has been increasing interest concerning the response patterns of organizations to changing environmental conditions. Beginning with the open systems literature in the early 1960s, discussions have emphasized the importance of organization-environment interactions (Darren, & Snow, 1975). Recently, the influence of strategic decision makers as a key mediating variable in this relationship has gained increased importance (Anderson & Paine, 1975; Downey & Slocum, 1975). The purpose of this research was to examine how the key owner-managers of 90 small businesses responded to a major change in their environment, a flood.

In general, managers are motivated to respond to a variety of environmental stimuli to improve the performance of their firm by choosing among decision making alternatives. These alternatives are influenced by the manager's perception of the task environment. If the task environment of

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the organization has undergone a radical change or if the firm itself has been destroyed by a natural disaster, the decisions by an owner-manager should have a substantial impact on the firm's subsequent performance.

BACKGROUND LITERATURE

The literature dealing with psychological stress was found to be of considerable use in predicting and explaining how managers react to changes in the firm's task environment. Several authors (Kahn, Wolfe, Quinn, & Snoek, 1964; Lazarus, 1966; McGrath, 1976) indicate the amount of stress experienced by an individual is a function of his personality profile, resources available to cope with the source of stress, the nature of his past experience with similar stressful experiences, and his past performance under non-stressful situations.

A number of studies have demonstrated a relationship between Rotter's internal-external control construct (Rotter, 1966) and characteristics of a situation that determine whether or not a stimulus is perceived as threatening (Phares, 1968). This construct has been found to moderate the individual's decision making behavior under stressful situations (Lipp, Kolstoe, James, & Randall, 1968). The construct has two basic dimensions—internal and external. Externals believe rewards come from forces outside themselves, usually from chance, luck, or fate. In contrast, internals believe that they have personal control or influence over their life. The literature indicates that the internal's role in determining outcomes is based on an active posture, whereas the external perceives himself in a relatively passive role with respect to the environment (Joe, 1971; Phares, 1968). Thus, when confronted by a stressful situation, the internal may be more likely to adopt one decision making strategy for coping with the situation, while the external another.

Another important aspect in trying to understand an individual's reaction to a radically changed task environment is the resource base available for responding to the stressful situation. These resources (monetary, physical plant, et cetera) have been considered an important intervening variable between the source of stress and a person's reactions to it (Bates, 1963; Dynes, 1970). Besides monetary and physical resources, past experience with a similar stressor may assist the individual in deciding which types of resources and strategies may be most helpful in reducing the stressfulness of the situation (Postman, 1952; Weiner, 1966). Research and logic indicate that those individuals who have personal resources do not perceive the same amount of stress in the environment as do individuals who do not have personal resources to cope with the situation.

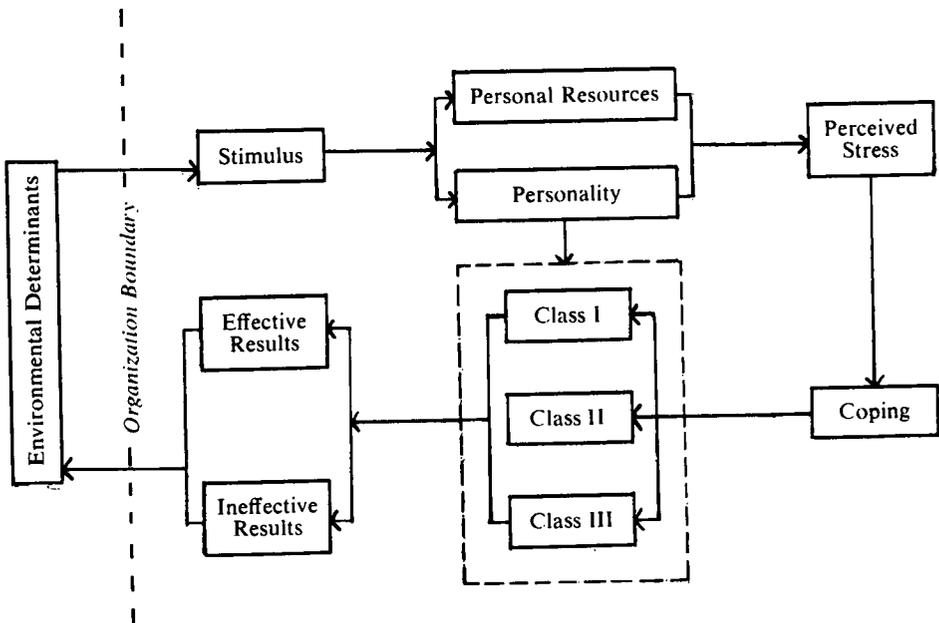
The stress and disaster literature has identified a multitude of specific behaviors individuals utilize in attempting to cope with a stressful environment (McGrath, 1976; Dynes, 1970). Kahn et al. (1964) have developed a classification system for understanding this myriad of responses. They

have identified three basic coping patterns: (1) those aimed at the objective problem situation (class 1); (2) those aimed at tension and threat in an emotional or defensive manner (class II); and (3) those aimed at problems resulting from earlier coping attempts (class III). The literature indicates that a manager's personality, resource holdings, and past experience with similar stressors interact to influence the individual's style of coping behavior(s). In small, owner-manager businesses, these relationships become extremely important, since it can be assumed that the manager's style of coping will exert great influence on the performance of the organization (Anderson, 1976).

In summary, where the task environment has undergone radical change resulting in stress for the owner-manager, the problem becomes one of determining the coping behaviors that this manager should exhibit to maximize his organization's effectiveness. The recent review of the organizational effectiveness literature by Steers (1975) clearly indicates that there is a lack of consensus as to what constitutes a useful and valid set of effectiveness measures. Criteria frequently used include the profitability, productivity, and adaptability-flexibility of the organization.

Figure 1 represents the major variables used in the research reported in this paper. The positioning of the variables in the model relies heavily on

FIGURE 1
Model of Response to Environmental Stress



the literature reviewed and on modelling attempts of Campbell (1970), Ghorpade (1971), Lazarus (1966), and McGrath (1976), among others. The basic model indicates that both personal resources and the individual's personality characteristics interact to determine the individual's perceived stress level. The perceived stress level directly affects the type of coping behavior exhibited by the individual, which is indirectly affected by the individual's personality. Each coping behavior can be defined as effective or ineffective in terms of the organization's overall effectiveness rating.

METHODOLOGY

Field interviews were conducted by two researchers with the owner-managers of 102 businesses selected at random from a Pennsylvania community labeled a disaster area by the federal government after it had been struck by Hurricane Agnes in June, 1972. Complete information was obtained from 90 of the businesses. To insure uniformity of response, a structured interview questionnaire was used in conjunction with several fixed response questionnaires. Because of the sudden, unexpected occurrence of a natural disaster, data were collected following an "after only" design. The data were collected approximately eight months after the flood. According to Lazarus (1966), a sufficient time lag is needed to: (1) avoid an over-response to the stressful conditions by the individual's involved in the situation, and (2) improve the ability of the individuals to relate historical descriptions of what they did as well as determine the degree to which the firm had recovered to its prestate business condition.

DESCRIPTION OF THE MEASURES

Stressful Stimulus

The primary stressful stimulus was defined as the business loss incurred as a result of the flood. The variables used to operationalize the level of loss included: (1) number of business days lost; (2) percentage of assets lost; (3) dollar loss per day as a result of being out of business; (4) percentage of customers lost; and (5) total loss. This classification scheme is based on two premises. First, certain objective losses might be more easily replaced than others and represent a smaller degree of threat. Losses such as goodwill and customers, while representing potential stress, do not lend themselves to as accurate an estimation as do others, e.g., percentage of assets lost. Second, in certain types of businesses, such as retail outlets, business days lost and an average dollar loss per day as a result of being out of business may represent a more accurate measure of threat than the actual dollar volume loss. To facilitate comparisons among firms, the following ratio was calculated for each organization:

$$\text{percentage loss} = \frac{\text{dollar amount of total loss}}{\text{dollar amount of total assets}}$$

This figure provides some comparability of data, regardless of absolute size of the firm. However, this ratio is not construed as representing a utility measure.

Resources

The personally held resources of the owner-managers that might be suitable for countering financial losses were also measured. Objective resources included insurance coverage and personal monetary resources (e.g., savings accounts, bonds, stocks). Past performance and a measure of total assets supplied by an independent national credit rating organization were also used to measure the resources available to the manager.

Personality

The personalities of the owner-managers were assessed on the basis of the Internal-External Control Construct (Rotter, 1966), a 29-item forced choice scale.

Internal control refers to individuals who believe that reinforcements are contingent upon their own behavior, capacities, or attributes. External control refers to individuals who believe that reinforcements are not under their personal control but rather are under the control of powerful others, luck, chance, fate, etc. (Rotter, 1966, p. 618).

A split-half reliability coefficient for these data was found to be .76, which concurs with Rotter's reported results ranging from .65 to .70.

Perceived Stress

Perceived stress was assessed through the use of form B of the Subjective Stress Scale (SSS) (Kerle & Bialek, 1958). This instrument requires the respondent to make only a single response from a list of 15 possible responses which describe how one feels or felt at a particular point in time about a specific event. Respondents were asked to respond to the SSS according to their feelings immediately following the flood, since that was thought to represent the most meaningful response period. To validate the response on the SSS, a structured interview was conducted based on the critical incident technique. Instances of "noteworthy" stress-inducing properties were sought, such as instances of unusual "pressure" and especially threatening conditions. In sum, eight validity questions were asked in conjunction with the SSS. A Kendall's coefficient of concordance indicated that six of the eight supplementary questions were related ($w = .58, p \leq .001$) to the SSS.

Coping Behaviors

Coping behaviors were defined as specific responses of owner-managers to the perceived threat induced by the flood. An initial list of coping re-

sponses, organized according to the Kahn et al. (1964) classification scheme, was developed from written accounts of the flood and conversations with federal and state officials assigned as part of the relief force. The classes and the preliminary list of responses contained within each are defined as follows:

Class I—Behaviors aimed at resolution of the problem, i.e., dealing with the objective situation. Thus, class I mechanisms may involve reduction of stress-related problems by obtaining resources to counter the initial loss. These include actions taken to: acquire resources; alleviate losses; recover previous production, profit and other quantifiable levels; maintain employment levels; maintain customer levels; and shifting levels of aspiration through redefinition of goals.

Class II—Behaviors that deal with tension, threat, and other emotions. Thus, class II mechanisms are reactions to emotional consequences rather than objective characteristics. These include: withdrawal; group affiliation with the immediate work group or with external task force groups; and hostility and aggression.

Class III—Behaviors that deal with secondary or derivative problems resulting from coping attempts; primarily failure during initial coping attempts. The principal "failure" behaviors in class III coping included dimensions such as: failure to acquire additional employees for help in cleanup work; failure in efforts to retain customers; failure in efforts to secure loans, etc. Class III behaviors were interpreted as an indirect failure during the recovery process and should not be viewed in the same sense as class I or class II, which are behaviors indicative of initial coping attempts.

Coping mechanisms for the three categories were scored in the following manner. All interviewed owner-managers were rank ordered with respect to relative use of class I and class II mechanisms. Relative use was defined as a combination of the total time period of usage of a given mechanism and the number of different mechanisms used within a given class. Within this scheme, the extensive use of only one mechanism in a class would receive a relatively high score, as would the use of several different mechanisms in a class although each is used individually to a lesser degree. This type of ranking system provides a relative picture of the coping behaviors exhibited by owner-managers to counteract the environmentally imposed threat. Class III coping was scored as the absolute number of mechanisms used in this category. This served as an indicator of coping failure.

Effectiveness

An effective organization was defined as one which returned to at least its former economic position (in terms of sales, profitability) in as short a time as possible. This definition recognizes two elements: (1) the ability of the

owner-manager to acquire scarce and valued resources to sustain the firm's functioning; and (2) the effective utilization of these resources once acquired. Since data were obtained only eight months following the flood, short-term effectiveness was the primary consideration. Performance ratings from an independent national credit rating agency were the basis for evaluating the degree of organizational effectiveness before and after the flood. Performance rating effectiveness scores were available for the period immediately before the flood and for the period during which the interviews were conducted. Differences between these scores constituted the effectiveness scale.

To validate these effectiveness data, two independent judges from the local Chamber of Commerce also rated each firm on a "before-after" recovery performance basis (Kendall's Coefficient of Concordance, $W = 0.68$, $p < 0.001$). In addition, interviewer ratings were obtained. The interviewer ratings were based on the relative state of the business at the time of the interviews, i.e., evidence of flood damage, apparent success of recovery, and overall impression of recovery (Kendall's Coefficient of Concordance, $W = 0.69$, $p < 0.001$). These results indicate that criteria used by the credit rating agency are suitable measures of performance.

RESULTS

The findings presented in this section provide insight into three areas of inquiry: (1) the degree to which the owner-managers exerted influence over the patterns of organizational response to an environmentally-induced crisis; (2) the behavioral, especially decision-related, determinants of owner-manager effectiveness in a crisis situation; and (3) the extent to which the owner-managers were influenced by objective and subjective factors in solving environmentally induced problems.

To test the relationships previously presented in Figure 1, Spearman Rank Order Correlations were calculated. The only requirement for this test of association is that the variables meet at least the requirement of ordinal scales. Since the measures ranged from ordinal to interval scales, this test is regarded as conservative.

Environment and Perceived Stress

Data indicating the relationship between the objective amount of environmentally-induced stress and the owner-manager's initial perceived stress revealed a significant relationship ($r_s = .23$, $p < .025$) between the percentage of assets lost and level of initial perceived stress. In addition, a positive and significant relationship between the total number of business days lost and level of initial perceived stress was found ($r_s = .28$, $p < .01$). Since a majority of firms were involved in retail or wholesale sales for at least part of their business, this factor was judged by the owners to be a critical measure of losses sustained. All other environmental/perceived

stress relationships were found to be nonsignificant. The nonsignificance of the relationship between dollar loss as a result of being out of business and perceived stress is surprising, given the previously identified finding. One explanation lies in possible measurement error of dollar loss. Sixty-eight percent of the respondents initially reported that they had "no idea" as to the specific dollar amount of their losses from being out of business. When pressed to arrive at a figure, all made some estimate and this estimate was initially assumed to be accurate. However, this assumption is now questionable given the results of the statistical tests and the subjective interpretation of the interview situation. The lack of any significant relationship between percentage of customers lost and perceived stress is apparent, since only 10 of the 90 respondents reported any customer losses and only one of them reported substantial losses. The nonsignificant relationship between total loss as a result of flooding and perceived stress might be explained in terms of relative rather than absolute losses. For example, total loss may have been high for a relatively large firm but this loss was a small percentage of its assets, and vice versa for a small firm, but this could not be ascertained from the data.

The second general set of relationships, personal resources/stress perception, yielded only one significant finding. There was no significant relationship between past experience with a similar stressor and perceived stress. Although 26 percent of the respondents reported that they had some experience with a similar stressor (especially a similar flood which occurred in 1936), the respondents did not report any benefits from this previous experience. However, it was confirmed that individuals with relatively high levels of applicable insurance perceived less stress than those with relatively low levels ($r_s = .22, p < .025$).

Individuals holding a high level of personal monetary resources did not perceive less stress than those who held low levels of monetary resources. The majority of respondents reported that without federal or state aid they would have had no choice other than to cover losses from personal resources and would have been forced to cover these losses adequately. Individuals who had been relatively successful in the past did not perceive less stress than those who had been relatively unsuccessful. There are several plausible explanations for this finding. First, prosperous businesses may experience high stress through negative interpretation of certain factors, such as a slowdown or stopping of growth potential. On the other hand, past success may reduce stress, since a success syndrome has been reinforced through prior experience. Likewise, unsuccessful businesses may experience relatively small amounts of stress due to a "new lease on life" atmosphere. The exact nature of this relationship could not be more explicitly elaborated upon from the interview data. Finally individuals who had a relatively high external credit rating did not perceive less stress than those with relatively low credit ratings.

Personality, Stress, and Coping

The data also indicated that those owner-managers who scored as internals on Rotter's instrument perceived less stress than did individuals who scored as externals ($r_s = .61, p < .01$). Thus, the owner-manager's personality was significantly related to his perception of the stressful situation. Given this relationship, a further analysis was undertaken to investigate the relationship between personality and coping behaviors. Consistent with the internal's proactive orientation to his environment, a significant correlation was found between the selection of class I coping behaviors (task centered) and internal orientation ($r_s = -.54, p < .01$). This finding was also validated in conversations during the interview process. Both interviewers noted significant differences during post hoc analysis in the approaches taken by internal versus external respondents as well as their perceptions of the flood situation. At the time of the interview, some externals had still made no attempt at recovery while several internals with similar damage levels had reached a preflood state three weeks following the disaster.

The model in Figure 1 also suggests a direct relationship between perceived stress and coping behaviors. The data indicated that those individuals who perceived high stress were more likely to use class II coping behaviors than individuals who perceived low stress ($r_s = .62, p < .01$). Since class II coping behaviors are those that deal with emotional reactions (withdrawal, hostility, aggression, et cetera) to the stressful situation, the result was expected.

Relationships with Effectiveness

In an attempt to determine the relationship between each class of coping behavior and the firm's effectiveness, three separate analyses were performed. The literature has indicated that class I coping behaviors should be more strongly related to effective performance than class II or class III coping behaviors. The data indicated a positive and significant correlation ($r_s = .49, p < .01$) between class I (task centered) coping behavior and effectiveness, a negative and significant correlation ($r_s = -.24, p < .025$) between class II (emotion centered) coping behavior and effectiveness, and a negative and significant correlation ($r_s = -.44, p < .01$) between class III (failure) coping behavior and effectiveness.

Because of their importance in the effectiveness literature (Steers, 1975), four other variables were examined. They were: (1) the number of employees in the firm; (2) average past performance of the firm; (3) dollar amount of federal assistance; and (4) dollar amount of supplier loans. Significant correlations between two of the four variables and organizational effectiveness were found. First, the number of employees in the firm was significantly related to effectiveness ratings ($r_s = .31, p < .01$). A possible explanation for this finding is that firms who employed many people used their personnel for salvage and general clean-up operations. Since the

measure of effectiveness was the difference between pre-flood economic conditions and those that existed eight months later, this explanation seems plausible. Second, the past performance of the firm was also positively related ($r_s = .23$, $p < .01$) to effectiveness. The low magnitude of this correlation may suggest that a different set of decision making strategies is needed in the stressful situation as opposed to those required under normal operating conditions.

To provide a more comprehensive picture of the interactions suggested in Figure 1, multiple regressions were calculated for the following four variables: perceived stress, class I coping, class II coping, and organizational effectiveness. A Spearman Rank Order Intercorrelation matrix served as the input to each regression. The use of these coefficients may be somewhat inconsistent with certain regression assumptions; however, the literature indicates that this violation is of a less serious nature than violations of the assumptions for Pearson Product Moment coefficient through the use of ordinal data. Moreover, there are only minor differences from the usual Pearson Coefficient (Boyle, 1966; 1970). Table 1 presents the results of the regressions. Only significant variables, as determined by the previously presented bivariate correlation analyses, served as input to the regressions.

TABLE 1
Regression Analysis of Proposed Model of Response to Environmental Stress^a

<i>Dependent Variable</i>	<i>Beta Coefficient Variable and Independent Variable</i>	<i>Total Explained Variance (r²)</i>
Perceived stress	Locus of control	(.564)
	Level of insurance	(.148)
	Percentage assets lost	(.125)
	Days business lost	(.173)
		.46
Class I coping	Locus of control	(-.722)
	Perceived stress	(.306)
		.35
Class II coping	Locus of control	(.665)
	Perceived stress	(.213)
		.66
Organizational effectiveness	Class I coping	(.559)
	Class III coping	(-.432)
	Number employed	(.202)
	Average past performance	(.166)
	Class II coping	(.105)
		.53

^a See Figure 1.

The data in Table 1 provide further insight with regard to two important areas. *First*, the influence of internal control on decision making (coping) behaviors and the perception of stress is apparent. Internals were much more likely to employ class I mechanisms, while externals were more likely to employ class II mechanisms. The internal-external construct operates both directly through an interaction with class I and class II coping behaviors as well as indirectly through perceived stress. These indirect effects apparently result from perceived stress's mediating role between personality and coping behaviors. Thus, the model, previously presented in Figure 1 appears to have considerable potential in those situations where

managers have discretion to influence outcomes, such as in this study. This potential is especially apparent with respect to the personality, attitudinal, and coping variables. *Second*, organizational effectiveness is directly related to the relative use of class I (problem centered coping mechanisms) and inversely related to the number of class III (failure) mechanisms. It would appear that the coping (decision) behaviors of the owner-managers had a major impact on the effectiveness of the organizations in this study.

SUMMARY AND CONCLUSIONS

Five major conclusions were derived:

1. The most obvious conclusion is the important effects that the coping behaviors of the owner-managers appeared to have on the ultimate effectiveness of their organizations. The use of class I (problem solving) coping behaviors by the owner-managers was strongly related to organizational effectiveness. On the other hand, the use of class II (emotion centered) coping behaviors was inversely related to the effectiveness of the organizations, at least in the short run.

2. In these relatively small scale firms, the characteristics of both owner-managers and organizations seem to be crucial in understanding the processes of organizational adaptation under conditions of environmentally-induced stress. Managerial personality, as evaluated through the internal-external control construct, accounted for a large percentage of the explained variance in coping behaviors. An indirect influence on coping behaviors also occurred through the interaction of the internal-external construct with perceived threat, with internals experiencing less threat than externals. This finding supports the conclusions of Mitchell et al. (1975) that internals may be better able to adapt to rapid environmental changes than externals. However, this research provides some basis for refuting their claim of the lack of a practical impact for this construct (p. 629).

Two organizational characteristics were found to influence performance effectiveness. Number of employees was significantly related to effectiveness ratings, as was past performance of the organizations. The significant relationship between organizational characteristics and effectiveness is considered especially important, since it is likely to influence the mode of recovery.

3. The objective characteristics of the decision situation and levels of applicable resources were relatively unimportant contributors to the coping strategies used in recovery, i.e., they did not predict the level of perceived stress to a significant degree. On the other hand, there is evidence to suggest that at least one personality factor (externality) is common to both high stress and defensive coping behavior. Further analysis should clarify this relationship.

4. The stress/effectiveness model (Figure 1) represents an important step in providing an operationalized open-systems framework for understanding small business organization/environment relationships under con-

ditions of stress. Given the large number of variables, each with its own associated error terms, the model seemed to operate in a relatively satisfactory manner. The model, operational measures, and the data presented external to the model provide a substantial base for further testing and research along the following lines, particularly with respect to small businesses.

- a. The relationship between initial coping patterns and long-term performance should provide a further test of the validity of the model. It is possible that defensive coping is a necessary first step for some managers before problem solving can begin and that performance is satisfactory in the long run for these organizations. On the other hand, defensive coping may be an early indicator of ultimate failure. This question is currently under investigation.
- b. Further, the effects of structure need to be analyzed as they influence coping, stress and performance in the larger organizational setting. In this research, the structural variable was not particularly crucial to the analysis due to the centralization of decision making with the owner-manager. Research has indicated that this is not likely to be the case in situations where group decision making occurs or where decisions are decentralized according to a formal authority structure. There the organizational or political decision model may be more appropriate (Allison, 1973).

5. Finally, this research points out that a number of factors, both in the environment and intrinsic to the firms, contributed to their performance. In this setting, the coping behaviors of the owner-managers appeared to be the most predominant influences on effectiveness. Of course, this may not be the case in larger organizations where the decision processes are not as centralized or are in the hands of committees or groups. In those settings, other kinds of factors may predominate. One of the obvious limitations of the model and research presented here is that they were not designed to apply in large, complex organizations with many organizational levels and subsystems. While many aspects of this study may have utility in a number of settings, there is no a priori assumption that the results are directly applicable to large and complex organizations.

In summary, the effectiveness of a small organization's response to its environment appears to depend to a large extent on the coping behaviors of its key manager. These coping behaviors appear to result more from personal characteristics of the decision makers than from objective environmental demands or from available organization resources, at least under conditions of stress. This suggests that increasing the decision effectiveness of managers under conditions of stress should take the direction of "altering" their coping orientation, rather than simply providing other types of resources to aid recovery. This position is quite contrary to current thinking in the disaster relief area. In a business milieu that increasingly creates various forms of stress, the issues, findings, and questions set forth in this paper should become increasingly relevant.

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