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Interpersonal Evaluation, Cognitive Aspects and the Effects of Stress

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INTERPERSONAL EVALUATION
COGNITIVE ASPECTS AND THE EFFECTS OF STRESS

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ABSTRACT

The purpose of this study is to assess the influence of individual differences in information utilization on the interpersonal evaluation process, and to examine the effects of stress on the evaluator as he forms his judgment.

An experimental task was devised in which two groups of subjects, one high and one low in cognitive complexity, viewed bogus videotapes of one person in interaction with another. After viewing the tapes, subjects in both groups were exposed to one of three stress conditions: neutral or no stress; irrelevant stress, in which the stress is induced as part of another experiment; and relevant stress, in which the stress arises from the task itself. Each subject then recorded his evaluation of the target person.

The results indicated that subjects high in cognitive complexity wrote more complex evaluations than subjects low in cognitive complexity; subjects not exposed to stress wrote more complex evaluations than subjects operating in a stressful environment.

It is suggested that these differences are a function of the individual's ability to utilize information, based on the number of dimensions he has available for this utilization. The results suggest that stress, either by reducing the number of dimensions available or by weakening the links between dimensions, reduces the individual's ability to process the information.

INTERPERSONAL EVALUATION

COGNITIVE ASPECTS AND THE EFFECTS OF STRESS

Research on the processes and principles of interpersonal evaluation, or person perception, has in recent years been conducted using two quite disparate approaches, each emphasizing a particular mode of study and a particular theoretical context. One body of research, stimulated primarily by the work of Heider(1958) and given further impetus by the findings of Jones and his associates(Jones, Davis and Gergen, 1961; Jones, Jones and Gergen, 1963; Jones and Davis, 1965) focuses on the perceiver as one whose primary tasks are attribution and inference. The former process, as defined by Kelley (1967) in his summary of theoretical principles of attribution, is one of inferring or perceiving the dispositional properties of entities in the environment. That is, the perceiver seeks to find sufficient reason why the target person acts in a certain way. Hence, according to these researchers, the perceiver infers the stable dispositions or attributes of the target person from the latter's actions.

In addition, the evaluator or perceiver decides whether to attribute an action by the individual to that individual's intentions or to chance factors. The target person will be evaluated differently if the effect of an action is perceived as intended by him than if the effect is seen as accidental or unintentional. Our judicial system provides an illustrative example; a man who kills for revenge (i.e., he intended to kill) is judged more harshly than one who kills accidentally.

The attributive models of interpersonal evaluation, then, view the perceiver as a decision-maker, one who weighs the information received about the target person in accordance with what he has inferred about the individual from past contact(i.e., does this trait really belong to him?). A second line of research on person perception is concerned not with whether the perceiver actually ascribes a trait to the target person, but the manner in which the ascribed traits are joined. Mathematical theories of person perception accept the validity of all the traits of the target person presented to the perceiver, and are more concerned with determining the rules governing the combination of these traits to produce an overall impression.

One group of researchers, for example, favors an averaging type formulation, in which great attention is paid to the balancing of extreme traits by moderate traits(Anderson, 1959, 1965; Levy and Richter, 1963; Rimoldi, 1956; Weiss, 1963). Another group of investigators favors a summation model which holds that each new piece of information received about a target person by the perceiver serves to increase his attitude toward or evaluation of that person(Abelson, 1961; Gulliksen, 1956). In recent years, the addition of factor analysis as a technique for analyzing trait relationships has led to studies of such relationships in terms of constant error(Levy and Dugan, 1960), and the widespread use of multidimensional scaling techniques (Rosenberg et al, 1968). One of the most recent models developed, which analyzes an evaluation as a complex stimulus whose compound is the weighted average of its constituents, where the weighting associ-

ated with each element is directly related to its extremity(Manis et al, 1968), reflects a more sophisticated use of mathematics in its highly complex approach to the evaluation process.

Ultimately, any theory of interpersonal evaluation must concern itself with the cognitive processes by which bits of information about the target person are selected and eventually organized into a unified evaluation or opinion. While such processes have not been the nexus of interest for either of the two models discussed, both have attempted to indicate, at least indirectly, the nature of information utilization. Attribution models, for example, suggest what may be loosely termed an "input filter", with the individual accepting or rejecting various traits, depending on past information accepted as valid. Similarly, mathematical models, operating on the assumption that all traits have been accepted as valid by the perceiver, focus on combinatory rules.

It is surprising, therefore, that interpersonal evaluation theories in which cognitive processes play a substantial role have by and large neglected the inclusion of individual differences in the operation of such processes as factors relevant to that evaluation. Evaluation theories have consistently assumed that the unique cognitive, as well as motivational, characteristics of the perceiver are irrelevant to the manner in which he evaluates another individual. Perhaps, then, additional light may be shed on the evaluation process by examining it within the context of individual differences in the utilization of information. In other words, in what ways in informa-

tion about another person received, selectively processed and weighted by the perceiver in the same manner as any other type of information?

In this respect, the research of personality theorists on cognitive styles may prove illuminating. Cognitive styles refer to relatively fixed patterns for experiencing the world, mechanisms by which information about the environment is selected, organized and combined. Of these, the cognitive style which has been most concerned with individual differences in the ability of the individual to differentiate the behavior of others has been cognitive complexity-simplicity.

In their formulation of the cognitive complexity-simplicity variable, Schroder and his associates(Schroder, Driver and Streufert, 1965) view it as a construct dealing with the nature and interdependence of rules avilable for organizing dimensional values. Like Bruner(1957, 1961), Schroder employs the concept of "categories" or "dimensions"; each bit of information, whether about an event, object or person, is placed in one of the categories. In the case of information about a person, the ultimate combination of elements---in other words, the resulting evaluation---depends on how many ways the categories or dimensions are combined to produce a variety of aspects which the perceiver ascribes to the target person. This in turn is a function of the level of cognitive complexity possessed by the perceiver and environmental factors present while the information is being combined. Persons with a high level of conceptual or cognitive complexity not only have more dimensions available to them, but are also able

to combine the dimensions in more ways than individuals with a low level of cognitive complexity, who, Schroder notes, should tend to view information in terms of black and white with few shades of grey in between.

Schroder has used this formulation to predict differential utilization of non-social information, employing tasks in which the complexity of the information as well as level of cognitive complexity is varied. In one representative study, Streufert et al(1965), using the Inter-Nation Simulation Game(INS) as a testing instrument, examined the influence of cognitive complexity on decision-making, with the amount of information successively increased over a number of trials. Results indicated that subjects high in cognitive complexity are able to use more information and are therefore likely to make more adequate decisions. Other studies have examined the effects of this variable on conflict resolution (Schroder and Crano, 1965), perceptual processes(Schroder, Streufert and Allen, 1962) and component assessment (Schroder, Harvey, Hunt and Koslin, 1965).

A second line of research on cognitive complexity has linked it to a number of variables dealing with the social interaction process and to other personality variables. Bieri(1965), for example, has demonstrated that individuals high in cognitive complexity seem able to make more correct predictions about another's behavior, when given the same amount of information about that person as individuals low in cognitive complexity. Individuals high in cognitive complexity have also displayed a greater ability to deal with inconsistent infor-

mation(Mayo and Crockett, 1964; Leventhal and Singer, 1964), and, in general, seem slightly less extraverted(Bieri, 1957) and less susceptible to social desirability influences(Bieri, 1965).

The implications of this body of theory and research dealing with cognitive complexity for the study of the evaluation process seem clear. Two relevant factors emerge which form the basis for two hypotheses. First, it has been found that persons with a high level of cognitive complexity are able to combine categories in more ways; in terms of person perception, this should mean that they should produce more complex evaluations than individuals low in cognitive complexity. The latter, no matter how many traits are inferred or combined, should still evaluate the target person in terms of a few dimensions, primarily a "good-bad" dimension.

The second conclusion which can be drawn is that environmental factors(particularly stress) may influence the kind of evaluation which an individual produces. Schroder(1965) notes two fundamental properties of the environment which may influence utilization of information, environmental complexity and environmental stress or arousal level, and theorizes that as arousal level becomes too high, cognitive activity becomes more concrete,i.e., complexity level is reduced. It is therefore hypothesized that individuals operating under stress will produce less complex evaluations than individuals in a less threatening environment.

The term "stressful environment", unfortunately, is a general term which fails to indicate that stress may be introduced in the ex-

perimental environment by a variety of techniques which may have different implications for the subject's behavior. In the case of a subject asked to perform an experimental task, a stressful environment may be produced in two ways. It may emanate from the task itself(the demands of the task, for example), or it may be introduced without being directly linked to the performance of the task. An interesting question is whether stress will have a differential effect on the complexity of the perceiver's evaluation, depending upon which of these two ways it is induced in the subject. To investigate this possibility, two stress conditions, task-relevant and task-irrelevant stress, were included in the design.

Method

Subjects. 48 male college undergraduates, enrolled in an introductory psychology course, served as subjects. Participation was voluntary, and all subjects were paid $3.20 for their time.

Stimulus Materials. To provide a task adequately reflecting differences in utilization of information in evaluating another person, two videotapes were employed. Two accomplices, experienced in acting, were asked to produce different kinds of behavior while in interaction with each other. One served as the "neutral" party in the conversation. The other was, in one segment, mildly friendly; in another, mildly hostile. About four hours of conversation were videotaped, and two 5-minute segments, representing the two kinds of behavior,

were eventually selected as experimental items. To insure that the segments were both realistic and displayed approximately equal amounts of friendliness and hostility, the segments were screened by 10 independent judges who were not informed of the experiment's purpose. Five of the judges viewed the "friendly" tape; the remaining five viewed the hostile tape. The semantic differential(Osgood, Suci and Tannebaum, 1957) was employed to assess the judges' reaction to the target person. With 1 representing a very favorable judgment and 7 a very unfavorable judgment, the average rating was 2.50 for the "friendly" person and 5.2 for the "hostile" person; thus, the two kinds of behavior were equally polarized. A t-test, using deviations from the neutral point as scores, revealed no significant difference(t = .18, df = 8, NS) with respect to distance from neutrality.

Stress was manipulated by the use of electrical equipment, consisting of two control panels with a complex series of lights and dials mounted on a heavy frame. The words "Electric Shock Generator" were printed in large letters on one control panel, and electrodes were connected to the machine. To enhance the effectiveness of the equipment in inducing stress, electrode paste and an elastic band for securing the electrodes to the Ss were placed on the table in the experimental room next to the equipment. The ability of the equipment to induce stress was also pretested, using 6 Ss, again unconnected with the experiment in any other way. Half of these Ss were shown the

film segments and taken to the room containing the equipment; the others were taken to a similar room containing no equipment. Ss in the former condition reported significantly more symptoms of stress on a questionnaire(t = 4.74, df = 4, p .01) than Ss in the latter condition. Galvanic Skin Response(GSR) measures taken during this pretesting session confirmed the efficacy of the machine in inducing stress.

Procedure. All Ss were given a test of cognitive complexity (Bieri, 1955) several weeks prior to the experiment. A cognitive complexity score was derived for each S. and the set of scores split at the median. Ss scoring above the median comprised the high cognitive complexity (HC) group; Ss whose scores fell below the median were placed in the low cognitive complexity(LC) group. To minimize the effects of experimenter bias, Ss were then scheduled for experimental sessions by an assistant who was uninformed about the true nature of the experiment. E thus had no way of knowing the complexity level of the Ss during these sessions.

On entering the experimental room, each S was given a set of instructions to read before proceeding:

> In recent years, psychologists have become increasingly interested in how impressions of other people are formed and how evaluative judgments are made about them. Specifically, researchers have been concerned with the manner in which stable opinions are formed about an individual and persist even when that individual's behavior is different in different situations.
>
> In the first part of the experiment, you will see two pieces of film. Over the past semester, I have been bringing subjects into this room in pairs, telling them that my experiment dealt with impression formation, and asking them to talk with each other for awhile. Supposedly,

> they would then fill out rating scales of each other. In reality, their conversation was videotaped from behind a one way mirror. These two pieces of film are part of a conversation between two of these people. Please look at them carefully. Any questions?

Each S then viewed the two film segments. For the entire group of Ss, the order of presentation was counterbalanced, so that half the Ss saw the "friendly" tape first and half viewed the "Hostile" tape first. After seeing the tapes, the Ss were led to one of two randomly assigned rooms. Ss in the neutral or no-stress(NS) condition were taken to a room containing no electrical equipment and merely asked to spend five minutes recording their evaluation of the target person after seeing "two different sides of his personality." Ss in the two stress conditions were taken to the room containing the electrical equipment, and were given slightly different instructions, depending on the stress condition to which they had been assigned. Ss in the task-irrelevant stress condition(IS) were told that they had actually signed up for two experiments, and that after they had finished the evaluation, they would participate in another brief, unrelated experiment involving the use of the electrical equipment. Ss in the task-relevant stress condition(RS) were told that there would be another part to the experiment after they finished their evaluations, involving the use of the equipment. They were also told that this second part would require them to employ the information they had gained about the target person. Hence the implied threat of shock was in this condition directly linked to the information.

After the Ss had completed the evaluations, E conducted interviews to ascertain the effectiveness of the manipulations. All of the Ss were apparently unaware of the deceptions involved, and only one S voiced any suspicions about the E's veracity. Ss were then fully debriefed concerning the nature of the experiment, and the necessity of using the threat of shock as an experimental device was explained. E then answered any questions the Ss had until the Ss seemed satisfied with the explanations given. Each S was then paid $3.20 and sworn to secrecy about the experiment before leaving.

Results and Discussion

An analysis of the data was conducted for 42 of the original 48 Ss. Three Ss were eliminated because they personally knew the target person, three Ss repeatedly failed to appear for their experimental sessions, and one S was eliminated because of suspicion about the stress manipulation.

For each S, two separate scores were tabulated; the number of constructs used (the dependent variable in the study) and the total number of words employed in writing the evaluation. Each set of scores was then separately analyzed in a 2(level of cognitive complexity) x 3(stress) analysis of variance.

Table 1 lists the mean number of constructs used by Ss in each condition. The largest number of constructs was used by Ss high in cognitive complexity operating in a non-threatening environ-

TABLE 1

MEAN NUMBER OF CONSTRUCTS USED BY COMPLE-

XITY LEVEL AND STRESS CONDITION

	NS	RS	IS
High complexity	8.00	5.71	5.28
Low Complexity	4.28	3.71	3.14

TABLE 2

ANALYSIS OF VARIANCE FOR CONSTRUCT SCORES

Source of Variance	df	Mean Square	F
Complexity	1	72.02	36.74*
Stress	2	14.02	7.15*
Interaction	2	3.16	1.61
Within Groups	36	1.96	

* $p < .001$

ment; in general, Ss high in cognitive complexity used more constructs than Ss in the LC condition. Similarly, Ss in the neutral condition tended to use more constructs than Ss subjected to stress. An analysis of variance for these scores, given in Table 2, reveals both of these differences to be significant. Ss in the HC condition wrote significantly ($F = 36.74$, $df = 1/36$, $p < .001$) more complex evaluations than Ss in the LC condition; Ss writing their evaluations in a non-threatening environment wrote significantly ($F = 7.15$, $df = 2/36$, $p < .001$) more complex evaluations than Ss subjected to stress. No significant interaction effects were observed.

In earlier studies cited, it was evident that utilization of information of a non-social nature is influenced by both personality and environmental variables. These results strongly support the hypothesis that utilization of social information---characteristics or traits of a target person inferred from viewing that person in interaction with others---is affected in a similar fashion by both of these influences.

Since interpersonal evaluation is itself a process of utilization of available information, it is hardly surprising that differences in characteristic modes of information utilization produce different kinds of evaluations. Individuals high in cognitive complexity, who have available to them not only a larger number of dimensions, but also more schemata for organizing various sets of combinatory rules, were able to produce more complex evaluations than individuals with a low complexity index. It may be inferred that, subjectively, the latter

received less information about the target person, even though objectively the amount of information presented was equivalent for both groups. For example, Ss high in cognitive complexity, after viewing the "friendly" side of the target person, may have developed a number of dimensions as a basis for judgment, such as "fair-minded"; "friendly"; "good conversationalist." Ss low in cognitive complexity, on the other hand, might have placed all of this information in one dimension, "good." Thus, when asked to judge the person, the only evaluation that these Ss could make of him was that he seemed to be a "good" person.

Scott(1963) has contended that one's level of cognitive complexity may be defined as the number of dimensions available to the individual independent of the basic "good-bad" dimension. An examination of the evaluations written by Ss in both complexity groups tends to support this notion, although no quantitative data has been gathered. By and large, Ss in the low complexity group seemed less concerned with describing the target person in a number of ways than they were with ascribing to him one major quality---often either "good" or "bad" ---and defending that evaluation with examples of his behavior in the film segments.

The mean number of words used by the Ss in writing their evaluations is given in Table 3 for each condition. The means reveal no striking pattern, with each group of Ss averaging between 80 and 110 words. An analysis of variance for these scores, presented in Table 4,

TABLE 3

MEAN NUMBER OF WORDS USED BY COMPLEXITY LEVEL AND TYPE OF STRESS

	NS	RS	IS
High Complexity	87.0	102.0	83.57
Low Complexity	93.28	86.57	83.85

TABLE 4

ANALYSIS OF VARIANCE FOR NUMBER OF WORDS

Source of Variance	df	Mean Square	F
Complexity	1	91.52	.09
Stress	2	397.23	.42
Interaction	2	440.09	.47
Within Groups	36	935.1	

shows no significant differences for either main effects or interactions.

Correlations between all three sets of scores (cognitive complexity, number of constructs, number of words) are presented in Table 5. The only significant correlation obtained is for cognitive complexity score and number of constructs; these two sets of scores correlate at the .01 level ($r = .44$, $df = 40$, $p < .01$). The correlations between words and cognitive complexity and between words and constructs are negligible.

One problem with using the number of constructs as a measure of complexity of an evaluation is that it may be contaminated by the number of words the individual writes. Obviously, the more words a subject writes, the greater the probability that he will also use more constructs. Thus, differences in verbal fluency may obscure real differences in cognitive functioning, leading to interpretative difficulties. The data analysis for number of words used, however, indicates that at least in the present study, verbal fluency had no impact on number of constructs. Not only did an analysis of variance for words fail to reveal any significant differences in any combination of conditions, but, in addition, the correlation between number of words and number of constructs was only .003.

Figure 1 illustrates some of the relationships implied in the differences among the cell means for number of constructs. It is readily apparent that most of the differences in scores across stress levels were accounted for by the difference between the neutral condition and the two stress conditions. An orthogonal analysis of the cell means (Edwards, 1962) confirms this finding, with a significant ($t = 3.67$, $df = 42$, $p < .001$) difference between the Ns condition and the RS and IS

TABLE 5

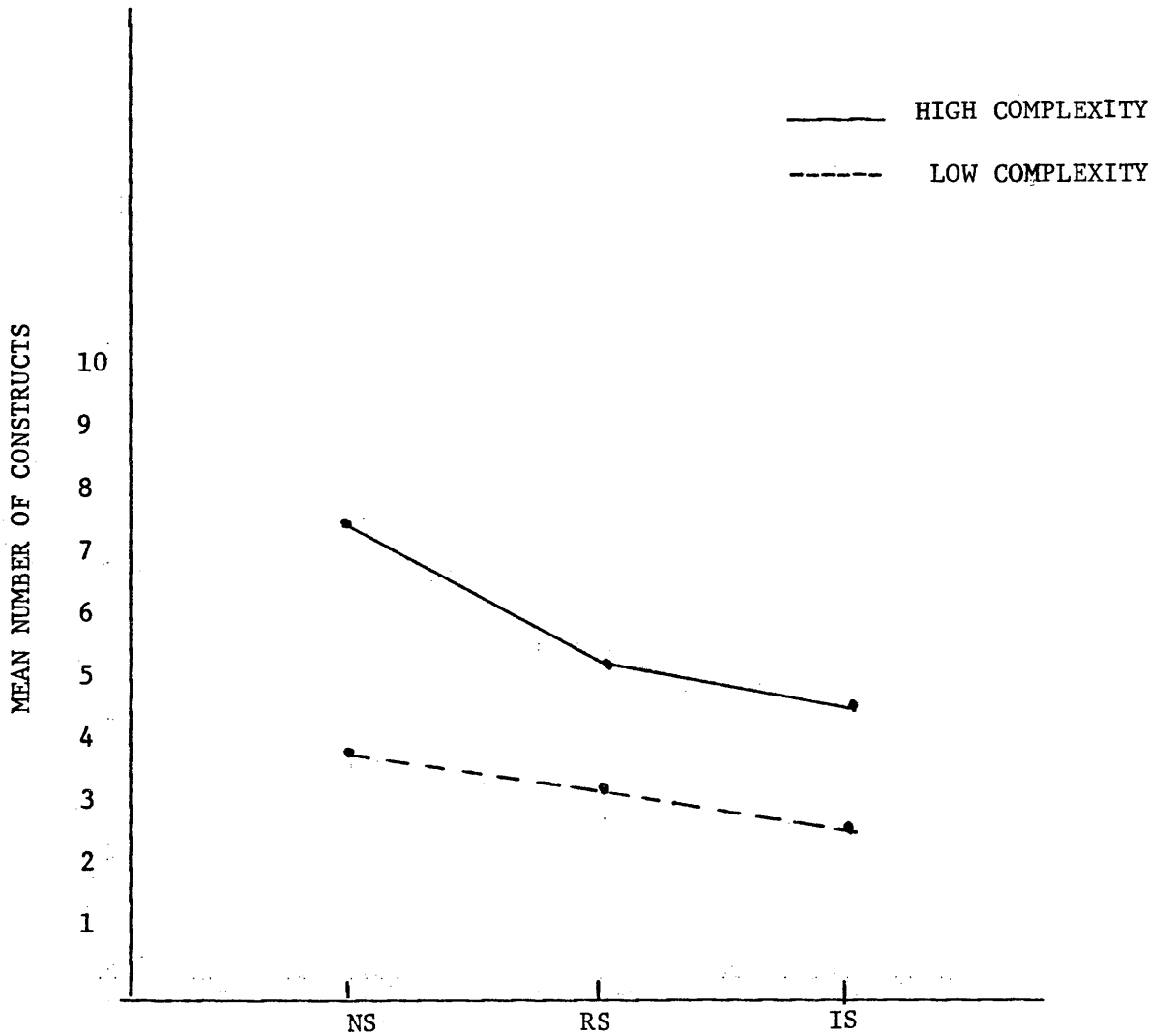
SUMMARY OF CORRELATIONS BETWEEN COGNITIVE COMPLEXITY SCORES, NUMBER OF WORDS AND NUMBER OF CONSTRUCTS

Complexity and Words	Complexity and Constructs	Words and Constructs
.12	.44*	.003

*$p < .01$

FIGURE 1

MEAN NUMBER OF CONSTRUCTS USED IN EACH CONDITION BY STRESS LEVEL AND COMPLEXITY SCORE


HIGH COMPLEXITY
LOW COMPLEXITY
MEAN NUMBER OF CONSTRUCTS
10
9
8
7
6
5
4
3
2
1
NS
RS
IS

conditions combined.

Despite the fact that no significant interaction effects were found in the analysis of variance for constructs, the influence of stress seemed to differ for the two complexity levels. In the HC condition, there was a proportionally greater decrease in the number of constructs from no-stress to stress conditions; the difference was much less striking in the LC condition. An analysis of simple effects (Winer, 1962) shown in Table 6, supported this interpretation. There was a significant difference (F = 7.6, df = 2/36, p .001) between the stress conditions for Ss high in cognitive complexity, while the difference in the LC condition was minimal (F = 1.16, df = 2/36, NS). 86% of the total variance for the stress conditions and the interaction of stress and cognitive complexity was accounted for by the differences among stress levels in the HC condition.

An assessment of the effects of stress reveals primarily that environmental stress reduces the capacity of the evaluator to cope with information about the target person, and that the strength of its influence may depend on the individual's normal level of cognitive functioning. The data clearly indicate a drop in the complexity of the individual's evaluation when environmental conditions are altered from normal to stressful. Schroder (1965) notes that stress might act in two ways on cognitive mechanisms: it may reduce the number of dimensions readily available to the individual for use, or it may weaken cognitive links between the different dimensions. The present study does not offer concrete support for one or the other of these interpre-

TABLE 6

ANALYSIS OF VARIANCE FOR SIMPLE EFFECTS OF STRESS

WITHIN EACH COMPLEXITY LEVEL

Source of Variance	df	Mean Square	F
Stress for High Complexity	2	14.90	7.6*
Stress for Low Complexity	2	2.28	1.16
Within Groups	36	1.96	

* $p < .001$

tations, but it does suggest that stress acts to reduce utilization of information already taken in rather than acting as any kind of "input filter." The fact that Ss were exposed to the threat of shock after viewing the videotapes eliminates the latter interpretation.

Moreover, stress seems to act in a similar manner regardless of whether or not it is directly linked to the information utilized in making the evaluation(i.e., whether or not it is perceived as relevant to the task). Within each complexity level, the reduction in the number of constructs used was identical for both task-relevant and task-irrelevant stress. Apparently, Ss do not make a distinction between shock which is going to be administered in another experiment and shock which is going to be administered as a part of the one they are engaged in; both are equally threatening. Perhaps making the shock contingent on how well the S performs his task, and providing him with explicit criteria for performance, would have produced a larger difference. An alternative procedure would entail making the stress not merely "relevant" to the task, but intrinsic to it. In this study, both kinds of stress were induced experimentally; for certain kinds of tasks, the stress is "built into" task performance. Fear of failure is a primary example of such stress, and in such a case, it is possible that significant differences would in fact be found between an "intrinsic stress" condition and a "task-irrelevant" stress condition.

On the other hand, the inference can be made that stress does function differently for high and low complexity Ss, with Ss in the

latter condition showing a smaller impairment in performance than Ss high in cognitive complexity. The simplest explanation for these results is that Ss high in cognitive complexity had "more to lose" than LC Ss. The latter are characterized throughout the literature as individuals possessing only a few informational dimensions. It is unlikely, therefore, that stress could have substantially reduced an already low level of cognitive functioning. In contrast, Ss high in cognitive complexity, with a large number of dimensions, show much larger reductions in ability to utilize information. Given this fact, further research might employ only high cognitive complexity Ss and delineate more precisely the levels of stress and their influence on the evaluation process. It is quite possible, for example, that a slight amount of stress would not impair, or might even enhance evaluative performance.

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