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The Aftereffects of Stress: An Attentional Interpretation

Sheldon Cohen
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ABSTRACT: Two studies were conducted in order to test the hypothesis that the aftereffects of stress on both performance and social behavior are attributable to a depletion of attentional capacity. This depletion, or "cognitive fatigue," was predicted to increase with both the attentional load and duration of an activity. A laboratory study demonstrated that aftereffects can be induced (without a stressor such as noise, crowding, or shock) by the performance of an attention-demanding task. Deficits on an aftereffects task increased as principal task demand and task duration increased. A second study, conducted in a field setting, found that after performing a high-load task, subjects were less likely to help a woman search for a contact lens than were their counterparts who performed a low-load task. Similarly, subjects who had been crowded were less likely to help than were those who had not been crowded. The data are interpreted as providing support for the "cognitive-fatigue" explanation of the aftereffects of stress.

Laboratory research (e.g., Glass & Singer, 1972; Sherrod, 1974) suggests that environmental stressors—at least when they are unpredictable and uncontrollable—have aftereffects that appear relatively soon after stimulation is terminated. Impairments in task performance, frustration tolerance, and ability to resolve cognitive conflict have been the aftereffects most often observed in previous research. Recent studies also suggest that aftereffects take the form of negative interpersonal behaviors including decreased interpersonal helping

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The research reported in this article was supported by a grant from the National Science Foundation (SOC 75-09224). Study II was part of the second author's Master's thesis.
The authors are indebted to Art Ellsworth, manager of Valley River Center; to Ann Lezak and George Hochsteller for serving as experimenters; to Caroline Greding and Valerie Kimble for serving as confederates; to Lita Furby for statistical counsel; to Mike Kemp, Al Murphy, and Nick Garshnek for technical assistance; and to David Krantz, Myron Rothbart, and David Mandel for comments on an earlier draft.

0361-3496/78/1500-0043$00.95 ©1978 Human Sciences Press

Sherrod & Downs, 1974) and increased aggression (Donnerstein & Wilson, 1976).

Glass and Singer (1972) have attributed these poststimulation effects to "behavioral residues" that result from exposure to uncontrollable stress. This analysis is, however, more descriptive than explanatory. Alternatively, it has been suggested (Glass & Singer, 1972; Seligman, 1975) that these results are an example of learned helplessness. That is, subjects unable to control a stressor learn that their reinforcements are independent of their responses, resulting in *motivational deficits* manifested in poorer performance on poststimulation tasks. This analysis is also in question, however, with recent data suggesting that following stress exposure subjects showed increased aggression rather than the withdrawn passivity characteristic of helplessness (Donnerstein & Wilson, 1976).

A recent theoretical paper (Cohen, 1978) suggests an *attentional* explanation for the aftereffects of stress. Cohen argues that unpredictable and uncontrollable stressors, because they are potentially threatening, substantially *increase demands on attentional capacity*. This increased demand occurs because individuals are required continually to monitor potentially threatening stimuli in order to evaluate their adaptive significance and decide on appropriate coping responses (cf., Lazarus, 1966). He further suggests that an individual's attentional capacity is not fixed, but shrinks when there are prolonged demands. This shrinkage, or "cognitive fatigue," increases with both the *attentional load* of an activity and the *duration* of an activity. Thus, prolonged exposure to an environmental stressor and/or a high information rate task should result in cognitive fatigue—an insufficient reserve of attention to perform demanding tasks.

What are the implications of the cognitive-fatigue hypothesis for the performance of ongoing and aftereffects tasks? Task duration under experimental conditions is usually limited to between 20 minutes and an hour. While this may be sufficient to cause a significant decay in available capacity, it may not affect performance on an ongoing task, which by that point is well practiced and requires little effort. Aftereffect tasks, however, demanding considerable attention on the part of the subject would be sensitive to fluctuations in available processing capacity. Thus, we would expect depletions in attentional processing capacity resulting from prolonged task and environmental demand to be manifest in deficits on difficult tasks administered immediately after termination of the principal task.

Cohen also suggests that posttask (or poststress) attentional deficits can have detrimental effects on interpersonal behavior. He argues that lacking adequate attention reserves, an individual sets priorities for use of his/her attention. The most usual strategy is to focus available attention on inputs most relevant to one's own goals, neglecting other cues, social and nonsocial alike (cf. Milgram, 1970). Important social cues that are often neglected when attention is restricted include those which carry information concerning the moods and subtly expressed needs of others. The neglect of such cues results in a lowered probability of helping another, expressing sympathy for another, or reacting appropriately to another's needs.

The first study is designed to determine whether deficits can be produced on the aftereffects tasks used by Glass and Singer (1972) by exposing subjects to tasks with high attentional loads for a prolonged period. Such aftereffects would establish the generality of these effects as a response to a wide range of situations including those in which *no additional stressor is imposed* over and beyond the required task. Specific predictions of the cognitive-fatigue hypothesis suggest that performance on aftereffects tasks will decrease as task demand and time on task increase.

The second study investigates the interpersonal aftereffects of high task demand and environmental stress. After experiencing either a high or low attention-demanding task in a crowded or uncrowded shopping center, subjects are confronted with a person requiring aid. As suggested earlier, both uncontrollable stressors and high task demands substantially increase demands on attentional capacity. If aftereffects are caused by an attentional deficit following substantial attentional demands, we would expect that helping will decrease as both task demand and density increase.

EXPERIMENT I

Method

Subjects. The 80 participants in this study were recruited by an advertisement in a local newspaper and from introductory psychology courses at the University of Oregon. Those subjects answering the ad received $2.25 for their participation, while those from courses received extra credit. All subjects were informed that their participation entailed two *separate* short experiments.

Design. The experimental design included two levels of task load (High Load/Low Load) by two levels of time on task (15 min./30 min.).

Procedure. Upon entering the laboratory, subjects were met by Experimenter A, who led them to the first experimental room. After being seated at the stimulus display, subjects were informed that the nature of the study concerned "people's reactions to colored lights over time." They were then introduced to a computerized reaction-time task which served as the vehicle for the experimental manipulations.[1] A stimulus board containing 12 colored lights (four each of blue, red, yellow) was employed with a three-key response-board (one each of blue, red, yellow). The subjects were told to respond to each light as quickly and accurately as possible by pressing the key with the corresponding color. They were also informed that they would be presented with a number of blocks of trials with rest periods between each block. A message, informing subjects of their rest periods, appeared on a cathode ray tube placed just to the left of the stimulus board. The reaction-time task began after Experimenter A ascertained that the subject had mastered a practice block.

Task Load. The two levels of task load were provided by the rate of presentation of the lights. The duration of a light was always 400 msec, while interstimulus interval (ISI) was either 200 msec (High Load) or 800 msec (Low Load). Subjects were allowed the entire 600 msec (High Load) or 1200 msec (Low Load) to respond. Regardless of level of load, a block was 2 minutes in length. High-Load (HL) subjects received blocks of 200 trials, while Low-Load (LL) subjects responded to blocks of 100 trials. Thus, during a 2-minute block, HL subjects were presented twice as many lights as LL subjects. Blocks of trials were separated by rest intervals of 10 seconds.

Duration. The second factor, "duration," was varied in terms of the number of blocks a subject received. The two levels of "duration" were 14 blocks (approximately 30 min.) and 7 blocks (approximately 15 min.)

In order to maintain subjects' interest and *equate perceptions of success*, false feedback on performance was presented to each subject after every other block of trials. The feedback was printed on the scope and took the form of a sentence message, "you are scoring better than ___ percent of all participants." All subjects received identical feedback. The feedback for subjects in the 15-minute condition was received following the second, fourth, and sixth block and read 66%, 68%, 71%. The feedback for the 30-minute condition was received following the second, fourth, sixth, eighth, tenth, and twelfth blocks and read 66%, 68%, 71% (and repeated) 66%, 68%, 71%. Postexperimental interviews suggest that subjects felt that the feedback was real.

Aftereffects Measures. At the termination of the reaction-time task, the subject was taken to another room for the "second" experiment. This procedure was employed in order to eliminate the possibility that the subject's feelings about the first experimenter (e.g., "the experimenter made me perform that difficult task") would affect aftereffects performance. Experimenter B who was unaware of the Ss assignment to experimental conditions administered the two aftereffects tasks (after Glass & Singer, 1972). The first test task was a measure of tolerance for frustration adapted from Feather (1961). Four sets of line diagrams were placed in front of the subject. The diagrams were printed on 5 X 7 inch cards and each of the four piles contained multiple copies of the same diagram or puzzle. The subject's task was to trace over all of the lines of the diagram without tracing any line twice and without lifting the pencil from the figure. The piles were placed in a specific order such that the subject would work first on an insoluble puzzle, second on a soluble one, third on another insoluble puzzle, and finally on another soluble one. A subject could take as many trials on a given diagram as he wished but was limited to a maximum of 40 seconds per card. The subject could choose to continue working on the same diagram or move on to the next pile at any time, but S could not return to a previous pile after proceeding to another. The cards were placed face down until the subject began working on the pile. If the subject successfully completed the task for one diagram, he was to proceed to the next pile immediately. The amount of time spent on each diagram was recorded. The more time a subject spent on the insoluble puzzles (Cards 1 and 3) the greater was his/her tolerance for frustration.

The second test task involved proofreading a seven-page prose passage. Subjects were told to read each page, circling the errors and putting a check mark in the margin next to the line in which the error occurred. Each page contained about 260 words, and about 10 errors were introduced systematically on each page. Errors took the form of grammatical mistakes, incorrect punctuation, misspellings, and typographical errors. Subjects were not told of the total number of errors (64) nor the amount of time allowed (15 min.). Quality of performance was measured as a percentage of "errors found" of the total number of errors that could have been detected at the point the subject was told to stop work.

Finally, each subject was asked to complete a short questionnaire concerning the "first" experiment (reaction-time task). On 12-point scales, the subjects were asked to indicate how frustrating, how mentally fatiguing, and how physically fatiguing they felt the task had been. Additional questions concerning which part of the task (beginning, midway, end) they found easiest and most difficult were included, as well as an open-ended (filler) question asking why they found the task difficult.

Results

Tolerance for Frustration. Data from the insoluble cards (Cards 1 and 3) are combined to provide the measure of frustration tolerance. As indicated in Figure 1 subjects in the HL condition exhibit significantly less tolerance for frustration in terms of persistence on the task than those in the LL condition—$F(1, 79) = 6.47, p < .02$. Although not significant, the effect for duration was also in the expected direction with 15-minute subjects persisting longer on the task than 30-minute subjects—$F(1, 79) = 2.52, p < .12$.

[1] The reaction-time task was used in this study as a means of manipulating task load, and no hypotheses were advanced in regard to task performance. Moreover, performance data on this task would be difficult to interpret since Low-Load subjects were allowed 400 msec more than High-Load subjects to respond to each stimulus. Therefore, no results are reported.

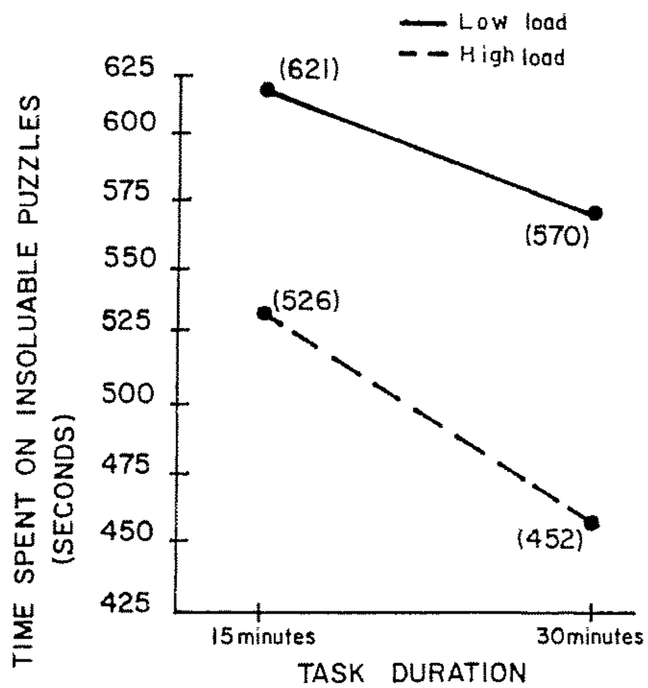

FIGURE 1. Persistence at insoluble puzzles as a function of the load and duration of a prior task.

Proofreading Task. Data collected on the proofreading task was analyzed in terms of the mean percent of errors detected at the point the subject stopped work:

LL, 15 min.. $\bar{X} = 51.75$; LL, 30 min.. $\bar{X} = 57.25$
HL, 15 min.. $\bar{X} = 53.55$; HL, 30 min.. $\bar{X} = 50.25$

There were no significant effects of the experimental manipulations.

Postexperimental Questionnaire. The subjects' perception of the load imposed on them is of interest, in light of the preceding results. Subjects in the HL conditions assessed their task as more mentally fatiguing ($F[1, 79] = 8.60, p < .01$) and more frustrating ($F[1, 79] = 11.02, p < .01$) than LL subjects. Similarly, more mental fatigue

($F[1, 79] = 6.16, p < .05$) is reported by 30-minute than 15-minute subjects.

There were also main effects for both load and duration in the analysis of physical fatigue ratings. The HL condition reported more physical fatigue than LL condition—$F(1, 79) = 5.12, p < .05$; the 30-minute condition reported more physical fatigue than the 15-minute condition—$F(1, 79) = 13.04, p < .01$. However, these main effects are due primarily to a substantial increase in fatigue in the HL, 30-minute condition. This is clarified by the interaction between load and duration—$F(1, 79) = 4.09, p < .05$. While there was no difference between the reported physical fatigue of the HL and LL subjects working for 15 minutes, HL subjects working for 30 minutes showed more physical fatigue than their LL counterparts.

Discussion

These data lend support to Cohen's (1978) argument that performance on a second (aftereffects) task is affected by both the attentional demand (information rate) and the duration of the preceding task. This statement should be qualified in that the aftereffects appeared only on the puzzles and not on the proofreading task and that the effects of duration were only marginal. It should be noted, however, that the proofreading task has been a less reliable aftereffects measure than the tolerance for frustration task (cf. Sherrod, 1974).[2] Moreover, the proofreading task requires subjects to have a basic knowledge of grammar, spelling, and punctuation. The large variances obtained on this task suggest that there was substantial variation among our subjects in terms of these skills. This variation may have overridden any possible differences due to attentional deficits.

Self-reports of mental fatigue increased with both task load and task duration. Thus subjects' self-perceptions are consistent with both the predictions of the cognitive-fatigue hypothesis and the data from the tolerance for frustration task. While self-reports of physical fatigue suggest that HL, 30-minute subjects were more physically tired (7.15, on a 10-point scale where 1 = not at all fatiguing, 10 = very fatiguing), there were no differences between the HL (3.60) and LL

[2] While several studies have replicated and extended the work on post-stimulation effects on performance (e.g., Sherrod, Hage, Halpern, & Moore, 1977; Wohlwill, Nasar, DeJoy, & Foruzani, 1976), only one (Sherrod, 1974) has used a proofreading measure. (The test used only the tolerance for frustration measure.) Sherrod (1974) found effects on tolerance for frustration but *failed to find any effects on proofreading performance.*

(3.45) conditions working for 15 minutes. Thus it is unlikely that differences between conditions in physical fatigue can account for the results since self-reports of physical fatigue do not parallel aftereffects performance.

It may be possible to increase the marginal effect of duration on aftereffects performance by increasing the difference between the short and long duration conditions. The rate of cognitive fatigue may be relatively slow or may decelerate after an initial spurt. Thus subjects in the 30-minute condition may not have reached the point of fatigue that would yield deficits in the aftereffects task that approach the customary level of statistical significance. Moreover, 15 minutes of practice on the reaction-time task may result in an easier (practiced) task and thus a decrease in task load for the second 15-minute period. This would be reflected in a deceleration of cognitive fatigue.

EXPERIMENT II

According to the attentional model discussed earlier (Cohen, 1978), the aftereffects of a stressing or attentional demanding situation are in the form of decreased attentional capacity. As demonstrated in Experiment I, such decrements in available attention can result in deficits on attention-demanding (complex) cognitive tasks.

Cohen also suggests that posttask (or poststress) attention deficits can have detrimental effects on interpersonal behavior. He argues that lacking adequate attention reserves, an individual sets priorities for use of his/her attention. The most usual strategy is to focus available attention on inputs most relevant to one's own goals, neglecting other cues, social and nonsocial alike (cf. Milgram, 1970). Important social cues that are often neglected when attention is restricted include those which carry information concerning the moods and subtly expressed needs of others. The neglect of such cues results in a lowered probability of helping another, expressing sympathy for another, or reacting appropriately to another's needs.

When lacking adequate attentional reserves, the probability of such helping responses can be affected in three ways: (1) The cue that suggests that a helping response may be required is not even perceived. Thus, if a husband does not see the distressed look on his wife's face, he cannot know that she is in need of sympathy. (2) The cue is perceived, but a lack of available attention makes the person incapable of evaluating its significance. Since distress cues are often ambiguous,

an evaluation is usually required in order to determine whether a cue actually represents distress and whether intervention on the part of the potential helper is appropriate (cf. Latané & Darley, 1970). This evaluation requires a substantial allocation of attention. Thus, a husband may perceive an emotional expression on his wife's face but not interpret its meaning. (3) The distress cue is perceived and evaluated, but aiding the person in need requires attentional effort that is not available or that is being reserved for an ongoing activity that is judged more important. Thus, a husband recognizes that his wife is distressed but finds it is more important to use his available effort to go over the accounts.

This analysis suggests that exposure to unpredictable, uncontrollable stress and/or substantial attentional demands will be followed by a decrease in attentional capacity that will result in a relative insensitivity to the needs of others. Two previous studies have demonstrated that exposure to unpredictable and uncontrollable noise is followed by decreased sensitivity to others, including decreased helping (Sherrod & Downs, 1974) and increased aggression (Donnerstein & Wilson, 1976). The present study is designed to determine whether (a) a task with a high attentional load and (b) exposure to uncontrollable density in a real-life setting will similarly affect the probability of offering token aid. If aftereffects are produced by cognitive fatigue, then we would expect that helping will decrease as task demand and density increase.

Irrespective of whether or not the attentional hypothesis is supported, this study provides the first test of whether aftereffects can be obtained outside of the laboratory situation. Previous studies have been subject to criticism because of the possibility that the stressing experience induced negative attitudes toward the experimenter or experimentation in general resulting in a lower level of motivation on subsequent tasks. The aftereffects task in this study is in no way related to either the experimenter or experimental situation and is thus not subject to such criticism. Moreover, the naturalistic manipulation of density and task load should help to determine the generality of previous findings.

Method

Subjects. In return for extra credit, 40 women from introductory psychology courses participated as subjects. All subjects were between the ages of 18 and 25, spoke English as their native language, and were unfamiliar with the experimental setting.

Procedure. Upon arrival at the experimental setting (a large, enclosed shopping mall), a subject was given a packet of task materials and told that the experimenter was interested in the accuracy with which she completed the tasks in the "shopping-center environment." After insuring understanding of the tasks, the experimenter gave the subject a stop watch for self-pacing and arranged to meet her near the site of the last task in "about half an hour."

Density. Two levels of density were provided by the natural fluctuations of user density at the mall. The Low-Density (LD) conditions were run on weekday afternoons; the High-Density (HD) conditions on weekend afternoons. (Ss were randomly assigned to conditions, i.e., assignment was not based on scheduling preferences.) To insure the stringent manipulation of density, the experimenter took a population count of the main mall area at the onset of each subject's participation.

Task load. The factor of task load refers to the number of activities in which the subjects engaged within a fixed time period. The tasks involved listing and pricing particular items in various stores. All subjects performed 26 tasks involving 8 shops. High-Load (HL) subjects listed and priced *twice as many items* for each task as Low-Load (LL) subjects. For example, subjects were required to enter a bookstore and list (copying from a visible sign) either (LL condition) the 5 best selling fiction and 5 best selling nonfiction books or (HL condition) the 10 best selling fiction and 10 best selling nonfiction books. All subjects were allowed 30 minutes to complete the 26 tasks. Thus, the rate of task-related information processed by HL subjects was necessarily twice that demanded of LL subjects. (There were no differences among conditions in time spent on tasks.)

All subjects were asked to perform the tasks in a specific, identical order. By ordering the tasks, subjects were required to make a number of traverses through the experimental setting and thus be exposed to the particular level of density. The tasks were designed (and pretested) to insure that HL subjects working at a slower pace could complete them in the alloted time.

Dependent Measures

Helping behavior. The dependent measure of helping was taken immediately *after* subjects had been exposed to the particular levels of task load and density. The "last task" was identical for all subjects, and was performed in a deserted hallway out of the mainstream of user traffic. Population count in the hallway insured it was uncrowded. (Immediately after each subject was exposed to the potential helping situation, 3-minute population counts were taken in the hallway. An analysis of variance indicated no differences in numbers of people entering the hallway under the various experimental conditions.) As the subject approached, a confederate took up her position outside the mall shop.[3] The confederate placed herself 2 to 3 feet from the subject and was ostensibly looking in the same store window that the subject was required to examine in order to complete her last task. After the subject completed filling in her answer sheet (there was only one item to be priced in all conditions for the last task), the confederate said "Oh God" aloud and examined her clothes (brushing them off) and the surrounding floor as though she were looking for something. If the subject asked, the confederate suggested that she had lost her contact lens.

The subject was expected to meet the experimenter on a nearby bench after completing her tasks. The bench, which was in easy eyesight (just 25 ft. away), was vacant. This freed the subject from time constraints which might have inhibited helping. An observer unobtrusively recorded whether and for how long (maximum of 120 sec.) the S aided in searching for the contact lens. After 2 minutes elapsed, the confederate gracefully excused herself to "find a mirror to search her lower eye." Both the confederate and the observer were blind to the experimental conditions.

Postexperimental questionnaire. Several minutes later the experimenter rejoined the subject and administered a questionnaire. Ten-point bipolar scales had been designed to assess the degree to which the subject found the environment to be crowded and unpleasant. Also assessed was the degree to which the subject found the tasks to involve mental effort, physical fatigue, interest, and feelings of success at the task.

[3] Two different female confederates were used. Analyses indicate no main effects for confederate nor any interactions between confederate and either of the experimental manipulations.

Results

Manipulation Checks

Density. From the population counts of the main mall area, the mean number of people present in the LD and HD conditions were 27.9 and 127.6, respectively—$t(38) = 30.79, p < .001$. The obtained ratings on the pertinent 10-point scale (1 = not at all crowded, 10 = = very crowded) revealed that subjects perceived the intended density. The mean rating for LD was 2.50 as compared to 8.10 for HD—$F(1, 36) = 355.032, p < .001$.

Task load. No differences were found between conditions in degree of perceived physical fatigue. However, a main effect for task load was obtained with regard to subjects' mental fatigue. Subjects in HL conditions found their experience significantly more mentally fatiguing than did their LL counterparts—$F(1, 36) = 30.803, p < .001$.

Task Performance. A two-way analysis of variance conducted on the percentage of incorrect responses to task items revealed no differences between conditions. There were also no differences between conditions on the amount of time required to complete their tasks.

Helping Behavior. Figure 2 presents the percentage of subjects offering aid in each condition. The *optimal* framework for analyzing effects in a multidimensional contingency table is a log-linear model

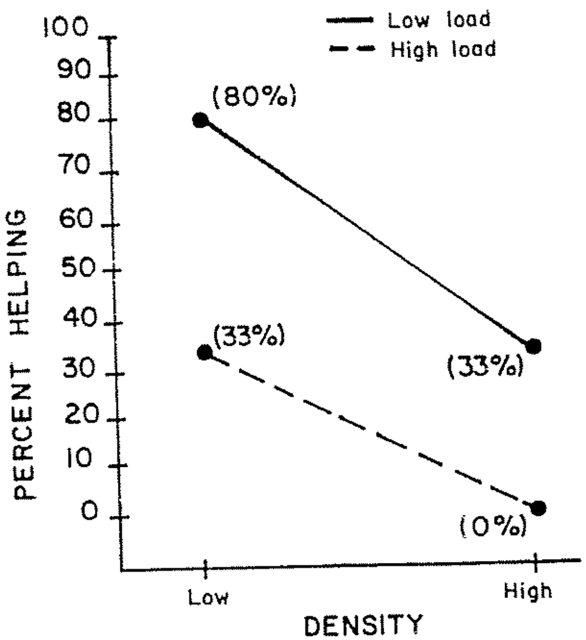

FIGURE 2. Percent helping as a function of the load of prior task and the density experienced during performance of that task.

(cf. Popper, 1973). The data collected on the dichotomous help/no-help measure were subject to such an analysis. The results reveal a main effect for Density ($\chi^2(1) = 8.5799, p < .005$), with uncrowded subjects helping more than crowded ones. A main effect for Task Load was also obtained ($\chi^2(1) = 8.5799, p < .005$), with LL subjects helping significantly more often than their HL counterparts. The interaction was not significant ($\chi^2(1) = .4218$).

Another approach to analyzing these data would ignore the dichotomous help/no help data and instead examine amount of time each subject helped. (Those subjects who did not help were included in the calculations as having helped 0 seconds.) The mean time (maximum 120 seconds) spent assisting the victim were:

LL, LD: 72.3 sec; LL, HD: 29.0 sec.
HL, LD: 19.9 sec; HL, HD: 0.0 sec.

The applicability of an analysis of variance to the data collected in terms of time spent in helping may be questionable due to the absence of variance in the HL, HD cell. Nevertheless, the analysis was deemed advisable in light of the positive results of Cochran's test for homogeneity of variance ($C[4, 9] = .4105$) and the robust nature of the ANOVA when cell sizes are equal. A main effect for density was obtained ($F[1, 36] = 5.566, p < .05$), with LD subjects helping longer than HD subjects. A main effect for task load was obtained ($F[1, 36] = 9.233, p < .005$), with LL subjects helping longer than HL subjects. The interaction was not significant ($F[1, 36] = .763$). These results are essentially the same as those based on dichotomous data. While it would be interesting to examine the time spent helping for only those subjects who actually helped, the lack of data (0 helpers) in the HL, HD cell and the small number of subjects in the remaining cells make this impossible.

Postexperimental Questionnaire. In response to items assessing the degree to which subjects found their experimental experience pleasant or interesting, and the degree to which they felt they had been successful at the tasks, no differences were found between conditions.

Discussion

Consistent with the attentional-fatigue hypothesis, both exposure to high density and the performance (for 30 min.) of a high information-rate task resulted in a decreased sensitivity to the needs of another. However, this study does not definitively establish that decreased sensitivity to others following exposure to environmental stress and/or high attentional demands is due to an attentional deficit. A strong alternative would attribute these decreases in helping to a negative affective state induced by the stressor (cf. Isen, 1970). However, the argument that HD and HL subjects suffered a negative affective state is not supported by the data which suggest no differences between conditions on perceptions of success, interest in the experiment, and pleasantness of the experience.

Alternatively, it could be argued that a high-load task and uncontrollable density induce feelings of helplessness. Thus if subjects perceive high-load tasks as ones in which they lack control over their outcomes, they may suffer from the motivational cognitive and affective deficits associated with helplessness. A state of passivity could account for the decrease in helping among the high-load and high-density subjects in the second experiment and for the decrements on the tolerance for frustration task in the first (cf. Cohen, Rothbart, & Phillips, 1976). There are reasons, however, to doubt this interpretation. Helplessness is presumably accompanied by a relatively negative affective state (cf. Seligman, 1975). As mentioned above, there were no differences between conditions in terms of reported affect—success and pleasantness of the experiment. Moreover, the mean ratings of both success and pleasantness were extremely high (mean ratings for all conditions exceeded 7.5 on a 10-point scale) suggesting that subjects in all conditions found the situation rather pleasant.

In contrast to the aftereffects of increased task load and exposure to crowded circumstances, are the results concerning tasks performed during the exposure period (measured only in Experiment II). Consistent with the results of previous studies (Donnerstein & Wilson, 1976; Glass & Singer, 1972; Sherrod & Downs, 1974), subjects showed no degradation in task performance, regardless of the type or level of the imposed stressor.

CONCLUSION

The two studies presented in this paper indicate that the aftereffects of stress can be induced by high attentional demands as well as stress exposure. Thus these effects are not limited to a restricted range of "stressful" situations involving a lack of predictability and control over a "distracting" stressor. Moreover, the demonstration of aftereffects in a naturalistic setting suggests the generality of these findings beyond the laboratory setting and indicate the inaccuracy of laboratory artifact interpretations of the aftereffects of stress. Finally, the data suggest that attentional processes may well be involved in these effects and that further research should focus on attentional as well as motivational explanations.

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