

Environmental Noise Level as a Determinant of Helping Behavior

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The results of research dealing with the effects of noise, on intrapersonal behavior suggest a variety of possible consequences for interpersonal functioning. The effects of various levels of noise on simple helping behavior were explored in a laboratory and a field setting for a total of 132 subjects. In both experiments, subjects exposed to 85-db. white noise were less likely than those in lower noise conditions to offer assistance to a person in need. The results were interpreted on the basis of prior research suggesting that noise-produced arousal leads to a restriction in attention deployment or cue utilization. Alternative accounts in terms of the effect of noise on mood and on drive level were also considered.

The effect of noise on intrapersonal behavior has long been of interest to general experimental and physiological psychologists, and the publication in recent years of a number of volumes on this topic (e.g., Broadbent, 1971; Kryter, 1970; Welch & Weleb, 1970) attests to the significance that these issues are currently accorded. Public concern over "noise pollution," congressional legislation dealing with permissible noise exposure levels in industrial settings, and work such as that of Cameron, Robertson, and Zaks (1972), suggesting that noise may be associated with the incidence of chronic and acute illness, provide further impetus for research of this sort. Investigations of the interpersonal impact of ambient noise, however, are much less in evidence, though Glass and Singer (1972) have provided a nice bridge between these two complementary focuses, and there has been work on the relationship between noise and conformity (Dustin, 1968), aggression (Geen & O'Neal, 1969; Geen & Powers, 1971), and verbal disinhibition (Holmes & Holzman, 1966).

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Earlier research by the authors on the psychosocial effects of ambient noise level (Canon & Mathews, 1971) has provided indirect support for the hypothesis that high noise levels may lead to lessened attention to the incidental social cues that structure and guide significant aspects of interpersonal behavior. Since an individual's interpretation of same situation as one in which helping behavior is appropriate might well be based on such cues and would seem to be a necessary antecedent to assisting behaviors, the present study explored the effects of various levels of ambient noise on the likelihood of helping in a very simple situation.

Several interrelated lines of research (Broadbent, 1958, 1971; Easterbrook, 1959; Hockey, 1969) have produced data suggesting that arousal leads to a state of restricted attention or cue utilization in which attention is concentrated on salient features of the setting at the expense of its other aspects. As arousal-induced attention restriction increases, performance is either facilitated or hindered, depending upon the task relevancy of the salient or dominant cues within the situation. Recent studies dealing with vigilance, learning, and performance (e.g., Hamilton & Copeman, 1970; Hockey, 1970a, 1970b; O'Malley & Poplawsky, 1971) have, indeed, demonstrated that noise does decrease the detection of, and responsiveness to, peripheral or nonsalient events, while the perception of, and responsiveness to, central or salient events is not hindered.

One implication of this effect for interpersonal processes is that with noisy environments, individuals may become less aware of relatively subtle cues produced in interpersonal interactions that more clearly define other's meanings, intentions, and behavior. In addition, this approach suggests that the course of ongoing behavior and/or interaction would be less flexible and less likely to change to a new direction, since individuals would be less attentive to events that are not directly related to ongoing activities. This implies that persons may become relatively more single-minded in their actions, and in a situation that involves another in need of assistance, less likely to interrupt present activities to perform helping acts.

Zimbardo (1969b), in a similar vein, has suggested that "sensory input overload" may lead to a state of deindividuation in which persons "treat others as if they were not human beings, as if they had no personal identity" (p. 206). Implied here is a process akin to the one developed above concerning responsiveness to peripheral cues, since one of the defining properties of a deindividuated state is that "the behavior must not be under discriminative stimulus control. It must be unresponsive to features of the situation, the target, the victim, or the states of self which normally evoke a given level of response or a competing response" (Zimbardo, 1969b, p.259).

An application of Milgram's (1970) concept of overload, developed in his treatment of the "urban experience," also suggests consequences for social behavior that are similar to those derived above. However, two important distinctions should be noted, since the earlier-discussed positions proposed a process that is not dependent upon learning and that yields a transitory state occurring with little or no time lag in response to appropriate environmental factors. Implicit in Milgram's

analysis is the notion of a continuing response resulting from temporally extensive experience with the precipitating stimulus conditions.

Two recent studies provide indirect support for noise-produced deindividuation. In both investigations verbal behavior was "disinhibited" by the presence of relatively high

levels of noise. Stanton (1968) found that more "extreme" or taboo words were produced in a free-response situation under high-noise conditions. Holmes and Holzman (1966), after instructing subjects to employ nonsense words at critical points while relating a personally embarrassing incident, reported a greater tendency of subjects to lapse into the use of meaningful English with high noise levels.

To test these implications, two studies were conducted in which subjects were presented with an opportunity to assist another person in a simple, nonemergency situation under various levels of ambient noise. Since the primary interest concerned the effects of noise rather than the complex concept of altruism, the circumstances involved a very uncomplicated and basic helping paradigm: The parties had no prior history of interaction, engaged in only the briefest of contacts with

no expectation of further involvement with one another, and were alone at the time of the contrived incident. The laboratory experiment involved a book-dropping episode and three intensities of noise, while the field study used a similar occasion for helping and two noise levels. An additional manipulation in the latter study was designed to produce two levels of incidental cues indicating the degree to which the accomplice was in need of assistance.

The attention-restriction position would predict a decrease in the tendency to help with an increase in noise level. Further, an interaction between noise level and the effect of the cues-for-helping manipulation would be expected. That is, presence of these cues should be associated with a higher likelihood of assistance giving in the low-noise conditions but not in the high-noise setting.

EXPERIMENT 1: LABORATORY

Method

Procedure. Fifty-two male subjects reported for an experiment on interpersonal perception. They were met at the door to the laboratory by the experimenter who indicated that they would have to wait for a few minutes before beginning the study. They were directed to a waiting room where they found another male "subject" (a confederate of the experimenter) seated in one of the two available chairs reading an article in one of the several journals he

held in his lap. The confederate was in the chair farthest from the door to the room, and thus the subject took the seat just adjacent to that door. After only a moment, the experimenter reappeared in the doorway and called the confederate to take his turn in the experiment. As he arose, he awkwardly clasped to his chest the two books, live

journal, and miscellaneous papers that had been in his lap, and as he crossed in front of the subject, the papers and journals slipped from his grasp and scattered on the floor. He moved without hesitation to recover the dropped materials that were spread over at least a 3 square foot (.9 m²) area and proceeded out of the room.

The dependent variable in the study was the presence or absence of helping behavior on the part of the subject in front of whom the materials had been dropped. A helping response was recorded only if the subject actually rose and assisted the confederate in retrieving the dropped materials.

The independent variable was the ambient noise level in the room during the period of the study. Three conditions were employed: (a) no artificially induced noise was present, and the natural level was 48 db. (C) 55 db. (C)-no noise; (b) a white noise generator was used to produce an ambient level of broadband, white noise at 65 db. (C)-low noise; (c) a broadband, white noise level of 85 db. (C) was maintained-high noise.

No explanation was given for the presence of the white noise, and its source was not immediately apparent, as the speakers employed were hidden from view behind a curtained area adjacent to the subject and the confederate.

Since the confederates in both this and the second study could not be blind to the noise conditions, several precautions were taken to eliminate the possibility of bias effects. Ten undergraduate nonpsychology majors were employed on a contract basis to assist in the studies, and their participation represented only one among a variety of duties. They were, of course, not told of the specific hypotheses being tested or what variables were being manipulated and, moreover, were never given an overall picture of the structure of the experiments until all

data had been collected. Discussion of any aspect of their work with others in the group was explicitly prohibited. Each assistant was given training and supervised rehearsal only for those limited activities that were his particular responsibility and each actually ran only a few subjects in each condition. Contact between the confederate and the subject was kept to an absolute minimum, and in no condition was there any verbal interaction prior to the drop. The drop was highly structured: The materials were always carried in the same initial order and had to fall within a standard 3 square foot (.9 m²) area unobtrusively marked off directly in front of the subject if the trial was to be counted. The limited knowledge of the design, the brevity and highly restricted nature of the confederate-subject contact, the simplicity and routinization of the activity involved, and the general insignificance of this work

TABLE I

SUBJECTS' HELPING IN THE LABORATORY EXPERIMENT

Helping behavior,	Noise level		
	Ambient	Low	High
Yes	13	10	7
No	5	5	12
% helping	72.2	66.7	36.8

48 db.
65 db.
85 db.

for the assistants were considered to be sufficient safeguards against the possibility of bias effects.

RESULTS

A one-way analysis of variance and linear trend analysis were performed on the dichotomous data (help vs. not help; see Edwards, 1972, pp. 124-125, regarding the robustness of the *F* test when using binomial data).

The results of the analysis of variance indicated a marginally significant difference between mean helping rates for the three noise levels, $F(2, 49) = 2.878$, $.05 < P < .10$. However, when the results were tested for a linear trend (see Myers, 1972, pp. 386-388, for coefficient determination for unequal treatment intervals), there was a significant linear relation between increased noise levels (as measured in decibels) and decreased helping, linear $F(1, 49) = 6.63$, $P < .025$. (See Table 1.)

EXPERIMENT 2: FIELD STUDY

A second experiment was conducted in a field setting in which nonreactive measures could be obtained and that might provide convergent corroboration of the data that resulted from the laboratory study. In addition, this study was designed to test the effect of noise level upon cue utilization. This provided an opportunity both to replicate the findings of the laboratory study and to obtain data that would permit a more accurate determination of the value of the explanation in terms of reduced cue utilization. The absence or presence of a cue designed to indicate the degree of legitimacy of the confederate's need for assistance was manipulated by having the confederate wear a full-length arm cast for half of the staged incidents.

Method

Procedure. The responses of 80 male subjects to an opportunity to render assistance to another male in a natural setting were observed. The locale was a curving, tree-lined, low-traffic-density street in a student apartment residential area. Three persons were involved in carrying out the study: An observer was hidden in a recessed stairwell across the street from the scene of the incident, which was staged by the other two accomplices. The observer had a clear view of the street from approximately 60 yards (54 m) above and below the incident site, and his duties were to give a "ready" signal when an appropriate subject was approaching, to give a "go" signal when that subject reached a point 12 feet (3.6 m) from the incident site, and to record the subject's response to the contrived situation. An appropriate subject was defined as any male walking alone, that is, one who was neither preceded nor followed by another person for a distance of 30 yards (27 m).

A second confederate was positioned with his back facing the sidewalk and leaning over inside the open rear door of a parked front-door automobile. The incident was staged in front of a house with a large lawn flanked by an apartment building on one side and a hedge on the other. Both the apartment building and the hedge continued from each side of the house up to the sidewalk. Because of the slight curve of the street and the presence of a series of trees in the planting strip between street and sidewalk, an approaching pedestrian's view of the confederate's activities was partially blocked. He could be seen bending over with his upper torso extending into the ear, but a clear view of just what he was doing was not available. The confederate busied himself at arranging some books that were stacked high in a 24 X 6 X 12 inch (.6 X 1.5 X .3 m) cardboard box that was seated atop another similar sized box. On the signal from the observer indicating that the subject had reached a point 12 feet (3.6 m) from him, the confederate picked up the boxes from the rear seat of the car, withdrew from its doorway, turned, and began walking toward the house in the background. He did nothing to acknowledge the presence of the approaching subject, who was by this

time approximately 6 feet (1.3 m) from the confederate as he crossed the sidewalk. At this point, two of the books delicately balanced atop the overflowing box spilled out, and as the confederate made a move to save them, several more fell, scattering over a wide area on the half of the sidewalk nearest the house. He paused for a brief moment, apparently puzzled over the dilemma in which he now found himself; that is, in order to retrieve the lost books, he would obviously have to go to the trouble of putting down somewhere the two apparently heavy boxes in his arms. At no time did he glance toward the subject or in any way indicate that he wished assistance. Following that brief pause, he either stopped and picked up the displaced books or, if the subject assisted him or asked if he could be of assistance, thanked him for his help and proceeded toward the house.

The third assistant was stationed in the yard of the adjacent house apparently worrying over a balky gasoline-engined reel-power lawn mower. He was kneeling next to the mower, intently examining the throttle mechanism with his back to the sidewalk and the activity going on there. At no time did he shift his attention from his work and appeared to be quite unaware of the presence of others and the book-dropping incident. His position was 25 feet (7.5 m) from the point of the drop and approximately 8 feet (2.4 m) to the right of the other confederate's direct path to the house.

In the low-noise condition the lawn mower was inoperative, and the average ambient noise level was roughly 50 db. (C). To create a high-noise condition, the lawn mower was running with its muffler removed, creating a noise level at the point of the drop of approximately 87 db. (C).

To manipulate cues indicating the legitimacy of the confederate's need for assistance, in one condition the confederate wore a cast on his right arm that extended from his wrist to his shoulder with a right angle bend at the elbow. In the other condition, of course, he was not so encumbered.

Information regarding subjects' self-reported mood or attention deployment was not obtained for experimental subjects because of the questionable validity of such responses. Given the very brief "treatment" period, the incidental nature of the treatment from the subjects' point of view, and the lack of time to cognitively structure the experience, any verbal report concerning the subject's mood or perception would have been of questionable value. Therefore, the only dependent variable measured was helping.

TABLE 2

SUBJECTS' HELPING IN THE FIELD EXPERIMENT

Condition	Helping behavior		
	Y	No %	helping
No cast	4	16	20
Ambient noise'			
High noiseb	2	18	10
Cast			
Ambient noise'	16	4	80
High noiseb	3	17	15

so dh.
087 dh,

RESULTS

A 2 X 2 (Noise X Cues) factorial analysis of variance performed on the dichotomous data (help or not help) resulted in highly significant results. As in the laboratory experiment, increased noise produced a significant decrease in helping in that although 5% of the subjects helped in the ambient

noise condition, only 12.5% helped in the high-noise condition, $F(1, 76) = 20.00, P < .001$.

(See Table 2.)

The cue-for-helping manipulation was also significant in that only 15% of the subjects helped the confederate when he was not wearing an arm east, while 47.5% of the subjects provided assistance to the confederate when he was wearing the east, $F(1, 76) = 15.03, P < .001$.

The Noise X Cue interaction was also highly significant as the presence or absence of the east on the confederate's arm was highly influential in determining the likelihood of helping under ambient noise conditions (80% of the subjects helped the confederate wearing the east, while only 20% of the subjects helped the confederate not wearing the east), whereas the effect of differential cues was nonsignificant for the high-noise condition (15% helping the confederate with the east, 10% helping the confederate without the east), $F(1, 76) = 10.70, P < .005$.

GENERAL

DISCUSSION

The basic findings of these two investigations are consistent and straightforward. With increasing ambient noise levels, the likelihood of simple helping behavior decreases. An interaction was present in that the physical characteristics of the confederate, which provided visual cues regarding the legitimacy and degree of his need for assistance, influenced the likelihood of his being helped in the low- but not in the high-noise conditions of the field study.

These results are consistent with the notion that high levels of ambient noise produce attenuation of attention to peripheral cues, that is, those not related to central, ongoing activities and concerns. This tendency for perceptual "filtering to be more extensive and evidence to be considered almost entirely from one source rather than another" (Broadbent, 1971, p. 16) with noise-induced arousal may well have general social implications, since one of its consequences may be, as Zimbardo (1969b) has suggested, "that individuals may orient toward others in a less personal and individual fashion. The presence of high levels of noise and the attendant attention restric-

tion would be expected to curtail the directive influence on behavior that the cues presented by another person and his or her characteristics would have in the absence of high-intensity noise.

An alternative explanation in terms of the aversive quality of loud and noxious noise might be advanced. Here it would be argued, for example, that the lowered tendency to help was a function of the subjects' desire to escape quickly from the immediate area of the unpleasantly noisy lawn mower, and thus subjects simply walked on past the dropped books and the fumbling confederate. However, such an account would be unable to deal with the similar results of the laboratory study. In this situation, there was no contingent relationship between the presence or absence of a helping response and escape from the loud white noise. Subjects were led to believe that they were simply waiting to be called to participate in an experiment, and failure to help could not be construed as hastening their exits from the waiting room. If anything, they might have assumed that the confederate was waiting for the same "experiment" such that helping him and thereby speeding up his departure might reduce the time they would have to spend in the noise-filled waiting room. However, noise level was inversely related to helping just as it was in the field study. Thus, an aversion explanation does not adequately account for the obtained results.

Finally, it should be noted that two additional interpretative frameworks might be seen as germane to these findings. One could, for example, contend that high-intensity noise influences mood or affective state as a consequence of its stressful nature. Subjective reports of annoyance or irritation with increasing noise exposure have been found by, among others, Stem, Gaupp, and Leonard (1970). Thus, in line with the contention of Clore and Byrne (1972) that personal affective responses mediate the expression of interpersonal behaviors such as evaluations, approach-avoidance tendencies, and attraction, lowered tendencies to help might be anticipated with high-noise levels. However, while numerous studies have demonstrated

that *positive* mood states are associated with increased helping (Aderman, 1972; Berko, Witz & Connor, 1966; Isen, 1970; Isen, Horn, & Rosenhan, 1973; Isen & Levin, 1972; Kazdin & Bryan, 1971; Moore, Underwood, & Rosenhan, 1973; Rosenhan, Underwood, & Moore, 1974), among those that have compared control and *negative* affect conditions, only Moore et al. have found clear-cut differences in helping. Thus, the viability of such an approach to the results of these studies is called into question in the absence of research that might clarify the specific conditions under which negative affective states will or will not influence assistance giving.

Alternatively, an interpretation might be advanced in terms of the presumed drive properties of noise as an intense stimulus that facilitates the occurrence of responses that are dominant in a particular situation (Hull, 1952; Spence, 1956). Geen and O'Neal

(1969), for example, used precisely this approach in a study which was interpreted as demonstrating that high noise levels, operating as a source of general arousal, enhance the likelihood of aggressive responses when they are assumed to be dominant in the subject's habit family hierarchy. Since in the present laboratory study, helping was the response of 72% of the subjects under ambient noise conditions, and thus was highly likely in

this situation, an increase in helping with increased noise level would be the straightforward prediction from this paradigm. Just the opposite tendency was found. However, it could be maintained that such an analysis overlooks the contention that a stimulus such as noise has both drive *and* cue properties (d. Hull, 1952). Cue properties might raise some response other than helping to a dominant position in the habit family hierarchy such that a noise-induced increase in drive level might eventuate in decreased helping.

Of course, this would be in direct opposition to the interpretation of the role of noise that Geen and O'Neal found to be successful in their study, but it is, nevertheless, a legitimate application of the social-learning position. One might speculate that leaving the field would be a likely response cued by the

loud noise, and this would, indeed, lead to the reduction in helping observed in the field study. In the laboratory investigation, however, escape from the noise was not possible, although some response(s) other than helping or escape could have been cued by the noise. Thus, an orientation of this sort is capable of providing a post hoc account of the findings. However, the obvious difficulties in developing specific predictions with regard to a particular set of circumstances from this general orientation seem to argue against its being viewed as the preferred account of the present results.

Two cautionary statements about the generalization of the reported data should be kept in mind. First, the noise used in both studies was nonevent, in that subjects' behavior in no way affected the onset or offset of noise. Zimbardo (1969a) has reported a series of studies indicating that perceived choice or control over stimulus events may significantly alter the influence of various motivational states. Second, the noise level was continuous rather than periodic or discontinuous. Glass and Singer (1972) and others reported that the effect of noise on complex tasks varies depending upon its unpredictably continuous or discontinuous presentation.

The present studies imply that the presence of high levels of noise may be an important factor not only in helping behavior but in other social interaction situations as well. The influence of noise would seem to be especially important in circumstances in which individuals'

behavior must be directed not only by events or cues relevant to central activities but also by subtle and unrelated happenings.

REFERENCE NOTE

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