

## INFORMATION AND ENVIRONMENTAL STRESS: REPORT OF A HOSPITAL INTERVENTION

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### ABSTRACT

An intervention was undertaken in the admitting area of a large urban hospital for the purpose of alleviating patient stress due to long waits, congestion, and lack of information. Signs were mounted in the waiting area, instructing patients about registration procedures and orienting them to nearby amenities, and literature was distributed about the hospital and its admitting procedures. The responses of ninety-four elective inpatients who received this information were compared with those of an equivalent patient group who entered the hospital under normal circumstances, i.e., without information.

Informed patients were found to be more knowledgeable about admitting procedures and available amenities. They were more self-reliant and made fewer demands on staff. In contrast, uninformed patients rated the hospital less favorably and were found to have elevated heart rates. Patients admitted under conditions of higher density gave more negative responses than those admitted under lower density conditions. In certain instances, information was shown to benefit more critical patient subgroups. Practical implications of these findings are discussed, with particular attention paid to the role of cognitive factors in mediating responses to stress and density.

Much has been written about the role of information in attenuating the effects of stress. In both laboratory and natural settings, researchers have demonstrated that receipt of information can help alleviate anxiety and restore feelings of environmental control. Some of the most notable investigations of naturally-occurring stress have taken place in hospital settings and high-density environments. Janis' study of surgical patients showed that patients who had obtained information about their surgical procedures experienced less postoperative stress than those without information [1]. Building on this research, Langer et al. reported superior adjustment on the part of patients who

were trained to focus on the beneficial aspects of hospitalization [2]. Advance preparation, such as this, enables people to select behavioral strategies which will optimize their performance in high-stress situations, according to Langer and Saegert [3]. They found that information coupled with reassurances from an experimenter enabled shoppers in a crowded supermarket to execute their tasks more efficiently, despite the high level of social density they encountered.

Information need not be delivered verbally in order to be effective. Wener and Kaminoff demonstrated that appropriate signage can significantly reduce confusion, anger, discomfort and perceived crowding [4]. These researchers mounted signs displaying registration and orientation information in a crowded visitors' lobby, and noted improvements in ease of registration as well as emotional state. Wener and Kaminoff explained their findings in terms of the "social overload" hypothesis [5], asserting that by orienting high-density users to needed environmental information, the salience of others, and hence the threat of social overload, was significantly minimized. They suggested, further, that informational signs would most effectively reduce stress in high-density situations, where social and environmental cues vie for attention, and the need for environmental clarity becomes a priority. Since Langer and Saegert found that their verbal information manipulation was successful in both high and low density conditions [3], it seemed logical to investigate whether *non-verbal* information would be just as effective in alleviating stress in both high and low density situations.

The admitting waiting area of a major urban hospital was chosen as an appropriate high-stress and variable-density site for such an intervention. Few would dispute that waiting to be hospitalized is an anxiety-provoking experience. The emotional responses triggered by anticipatory hospitalization are attributable to a variety of factors, including separation from familiar settings and people, surrender of control to institutional personnel, loss of privacy and mobility, fear of mutilation, and possible loss of life and limb [6-9]. As the initial point of encounter between hospital and patient, the admitting area and its staff can play a crucial role in shaping patient expectations and adaptation to hospital life [10, 11]. Yet, the specific impact of the admitting experience on patient attitudes and behavior has received little systematic attention from researchers. Although hospitals have recently been sensitized to the public-relations function of their admitting units, and the need to modernize reception areas in order to create a more attractive first impression, few medical institutions have seriously addressed the psychosocial and spatial needs of patients, staff and visitors in the design of waiting areas, nor have they explored the impact of a stressful admission on the physical and emotional health of patients.

## SOURCES OF STRESS

Observations and interviews with patients, administrators, and clerical staff of the hospital illuminated three major sources of patient stress in the admission process.

## Waiting Time

Of greatest concern to patients was the amount of time they had to wait prior to their admission. What made waiting particularly disconcerting was the seemingly inequitable distribution of waiting time. Patients expected to be admitted in the order of their arrival, but frequently this was not the case. Since hospital beds are assigned on the basis of physician service and patient gender, some patients must wait longer than others for the appropriate bed to become available. Unfortunately, this hospital policy was seldom clarified for patients in advance, resulting in frequent attempts by irate patients to ascertain reasons for the delay.

## Density

The main reception and waiting area for incoming patients, a 17' X 19', cheerfully-decorated room, seated twenty-one people. When seating capacity was exceeded, as it tended to be in the late afternoon (between 3 and 5 p.m.), patient annoyance and distress visibly increased. Unlike subjects in non-medical research settings who became more hostile as social density increased [12-14], these patients expressed no resentment towards incoming patients nor towards staff, but did blame the *hospital* for failing to provide adequate waiting facilities.

## Lack of Information

The absence of both orientation aids and adequate staffing contributed to the general chaos and confusion of the waiting areas and its environs. Clear and well-organized information was needed by patients at critical points in the admitting process, beginning with entry into the hospital. Many patients could not find the admitting office, although it was directly on their right as they entered the building. Once inside the waiting area, patients often just stood around, unaware of the need to register with front-desk staff so that the formal paperwork of admitting could begin. Another problem was that the process of admission had never been spelled out, so that the requisite procedures which patients had to undergo before going to their rooms—blood test, X-ray, EKG—often came as unpleasant surprises. Lastly, many patients asked questions about hospital services, and about amenities, such as restrooms, telephone, cafeteria, and how to locate them. These simple requests often required more elaborate responses on the part of the busy front-desk staff, whose primary functions were clerical, i.e., registering patients and verifying their room assignments. Because of the time pressures and frequent breakdowns in the communication system, this staff was often too rushed and overloaded to provide the kind of information and psychological support that many patients sought.

For patients, however, the long wait in overcrowded facilities, with insufficient information, served to exacerbate pre-existing anxieties and increase



Figure 1. Welcome and registration procedures sign.

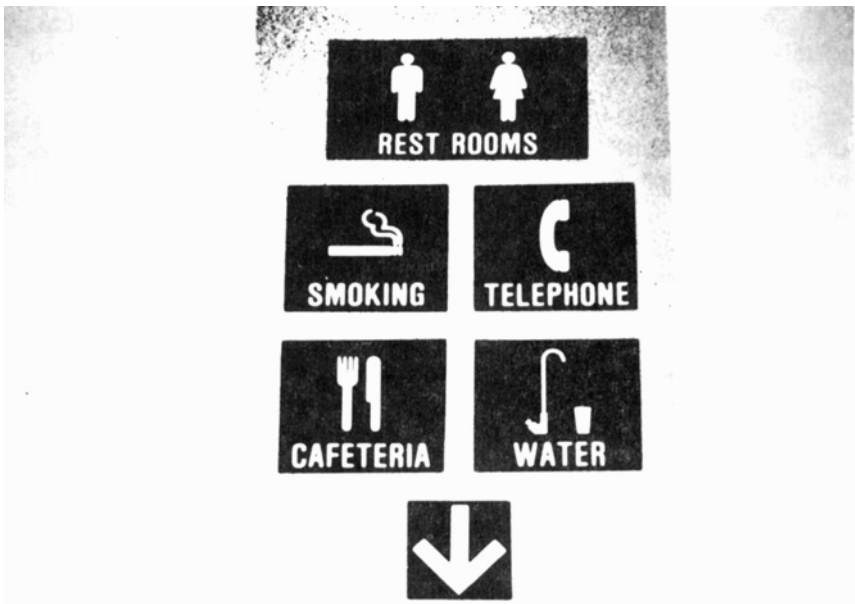


Figure 2. Orientation sign: Pictographs of amenities.

dissatisfaction with the hospital. The longer they waited, the more likely they were to report feeling angry at or abandoned by the institution, and the more often they sought out front-desk staff to demand explanations. Unfortunately, these interactions only served to prolong the process of admission, since staff had to interrupt their search for beds in order to answer questions and reassure concerned patients that they had not been forgotten.

In planning an intervention that would improve conditions for both patients and staff, a top priority was to minimize patient reliance on staff for verbal assistance. Much of the information that patients needed was simple and straightforward, and therefore could be presented in printed or pictorial format. After much discussion, a patient information system was prepared as part of an experimental intervention. This package included the following features:

- *WELCOME SIGN.* A large sign, which was visible from the lobby entrance, greeted patients, oriented them to the front desk, and described registration procedures (see Figure 1).
- *HOSPITAL INFORMATION BOOKLET.* Typically found in patient rooms, this booklet contains detailed information about hospital policies and services, and was made available to registering patients at the admitting front desk.
- *PATIENT LETTER.* Tucked into the above booklet was a two-page letter which addressed frequently-raised questions, explained admitting procedures and rationales, described amenities nearby, and assured patients that they had not been forgotten. (Although drafted by the researcher, it was approved with some revisions by the Director of Admitting, who was most supportive of this project. The final version of this letter to patients was signed by the hospital admitting staff.)
- *ORIENTATION AIDS.* Signs were mounted in the admitting area and outside lobby, indicating directions to nearby amenities with pictographs (for those who did not read English) and arrows. The purpose of these directional signs was to facilitate autonomous path-finding and eliminate the need to ask front-desk staff about amenities and their locations (see Figure 2).

With the exception of pictographs, all written information was available in both English and Spanish.

## HYPOTHESES

It was hypothesized that this intervention would produce the following changes in patient attitudes and behavior: increase their knowledge of admitting procedures and familiarity with the admitting environment; reduce patient-initiated interactions with staff; improve their evaluations of the hospital; reduce over-all anxiety; minimize perceived crowding, and reduce estimates of waiting time.

## Procedures

To assess the effects of this intervention, a pretest/posttest design was used. Those patients who were admitted to the hospital under normal circumstances, i.e., without information, were designated the pretest group. Following the collection of data from this group, signs were mounted in the waiting area and lobby, and literature describing hospital services and admitting procedures was distributed to all registering patients. Patients who were exposed to this information were designated the posttest group.

## Subjects

Eighty-six patients comprised the pretest, or *uninformed group*, while ninety-four patients comprised the posttest, or *informed group*. Published hospital statistics confirmed that the patient sample was representative of the larger hospital population with regard to key demographic variables, such as age, sex, and race. Most patients were white, semi-private, surgical patients who had been hospitalized previously, but not at this particular hospital. The sample was 51 percent female and 49 percent male, with a mean age of forty-six, and an age range of eighteen to eighty-four.

## Methods

Patients in both groups were observed at five-minute intervals as they waited, to ascertain their primary activities and to measure ambient density. In the Information (posttest) condition, patients observed reading the experimental literature were noted. Those who disregarded the literature (approximately 10-15%) were not sought later for an interview. Interviews were conducted with patients who had completed their clinical tests and were waiting to be escorted to their rooms. Topics covered included: hospitalization history, recall of registration procedures, estimated waiting time, knowledge of admitting procedures, and familiarity with nearby amenities. Patients were also asked to evaluate the hospital, its staff, and their own physical and emotional state on 6-point scales. Additional demographic data, e.g., age, illness, diagnosis, were subsequently obtained from the hospital's computerized census information system. Patients' electrocardiogram (EKG) readings were used as physiological indicators of arousal and anxiety, and were ascertained at a later time from patient charts.

## RESULTS

Analysis of the data confirmed many of the hypotheses cited above.

### Satisfaction with Information

An overwhelming majority of the informed patients reported receiving a satisfactory amount of information, in contrast to the uninformed patients

( $\chi^2 = 121, df = 5, p < .0001$ ) (See Table 1). More than three-quarters of the former reported that the information they received had been useful to them.

### Patient Knowledge

Patients were questioned about admitting procedures and available amenities, and their responses were coded according to how much they knew. Informed patients demonstrated greater knowledge of procedural details ( $F(1,163) = 8.63, p < .05$ ) and more familiarity with the admitting environment ( $F(1,180) = 77.99, p < .0001$ ).

Table 1. Mean Self-Report Scores and Observed Interactions with Staff as a Function of Information

<i>Measure</i>	<i>Information</i>		<i>No Information</i>		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>Cognitive/Behavioral<sup>a</sup></i>					
Amount of information	6.62	2.86	.32	1.28	.000
Knowledge of procedures	2.14	.52	1.90	.54	.004
Reliance on others for registration	1.32	.47	1.77	.43	.000
Knowledge of amenities	3.19	2.21	.89	1.10	.000
Observed interactions with staff (per hour)	4.33	1.68	7.11	3.71	.003
<i>Hospital Evaluations<sup>b</sup></i>					
Eased wait	.57	.50	.41	.50	.04
Concerned about me	3.09	1.75	2.83	2.03	.39
Prepared for me	3.75	1.58	3.65	1.66	.68
Overall evaluation	4.09	.95	3.98	1.14	.49
<i>Affect</i>					
Heart Rate <sup>c</sup>	74.38	11.77	78.45	13.08	.03
Worried	1.69	1.82	1.51	1.79	.50
<i>Perceived Wait</i>					
How long wait seemed	2.92	1.79	2.80	1.76	.67
Actual wait in minutes	52.67	24.50	52.15	27.10	.89

<sup>a</sup> Higher numbers indicate higher scores or rating.

<sup>b</sup> Higher numbers indicate more favorable ratings.

<sup>c</sup> Higher number indicates faster heart rate.

## Patient Self-Reliance

When asked how they knew where to register, a majority of informed patients (68%) reported using the sign for registration information, while most uninformed patients relied on other people (guard, staff, patients) for assistance in registration.

## Patient-Initiated Contacts with Staff

Observations confirmed that Informed patients approached front-desk staff significantly *less* often while they waited than did Uninformed patients ( $t(17) = 2.61, p < .01$ ). In fact, patient-initiated interactions with staff were reduced by nearly half, from an average of seven per hour to an average of four per hour, in the Information condition.

## Evaluations of the Hospital

Informed patients were more likely to report that the hospital had done something, rather than nothing, to ease their wait ( $F(1,175) = 4.19, p < .05$ ). Although mean ratings of the hospital's concern and preparation were in the expected positive direction, the differences were not significant.

## Affect

A comparison of mean EKG readings for both groups revealed that uninformed patients had faster heart rates, suggesting a higher level of anxiety ( $F(1,174) = 4.73, p < .05$ ). There was no difference between the two groups, however, on measures of self-reported anxiety and concern. A factor analysis indicated that ratings of patients' emotional states were correlated with concern about their medical condition, i.e., the more worried patients were about their medical condition, the less relaxed they tended to rate themselves on affect scales.

## Density and Perceived Crowding

Initial interviews with patients indicated that they tended to feel crowded only when they had no seat. Consequently, patients were classified as "higher density" when the number of people in the waiting room exceeded its seating capacity of twenty-one. The "lower density" condition was characterized by sufficient seating for all. Almost half (47%) of the total patient sample waited under conditions of higher density.

Higher-density patients were generally more negative in their evaluations of the hospital (see Table 2), particularly in reporting that the hospital had done nothing to ease their wait ( $F(1,156) = 4.93, p < .03$ ). Waiting time also seemed longer to them than it did to uninformed patients ( $F(1,157) = 6.79, p < .01$ ). There were no significant differences between the two groups on affective



Table 2. Mean Scores as a Function of Density

<i>Measure</i>	<i>Lower Density</i>	<i>Higher Density</i>	<i>F</i>	<i>df</i>	<i>p</i>
<i>Hospital Evaluation<sup>a</sup></i>					
Eased wait	.60	.42	4.93	1,156	.03
Prepared for me	3.91	3.47	2.94	1,153	.09
Concerned about me	3.14	2.81	1.03	1,141	.31
Overall evaluation	4.14	3.90	2.25	1,160	.14
<i>Perceived Wait</i>					
Under-Overestimate <sup>b</sup>	-2.47	+3.74	4.87	1,158	.03
How long wait seemed	2.53	3.27	6.79	1,157	.01
<i>Affect</i>					
Heart rate <sup>c</sup>	76.83	76.26	.08	1,155	.78
Impatient-Annoyed- Forgotten	3.13	4.11	2.27	1,160	.13
Crowded-Confined	3.14	3.35	.16	1,159	.69

<sup>a</sup> Higher numbers indicate more favorable ratings of hospital.

<sup>b</sup> Minus number indicates underestimate; plus indicates overestimate.

<sup>c</sup> Higher number indicates faster heart rate.

measures, although means were generally in the expected directions. Contrary to expectation, informed patients did not report feeling less crowded and confined than did uninformed patients. There was, however, a significant interaction between information and density ( $F(1,155) = 6.42, p < .02$ ). Informed high-density patients reported feeling less crowded than did uninformed high-density patients (means were 3 and 3.91, respectively).

### Waiting Time

The average amount of time patients waited before being called for their admitting interview was 52 minutes, with a range of 13 minutes to 2.75 hours. Patients were grouped into three waiting categories: Short (30 minutes or less); Moderate (31-59 minutes); and Long (60 minutes or more). Of the total sample, 15 percent had short waits, 51 percent had moderate waits, and 34 percent had long waits. Patients who waited over an hour felt significantly more impatient, annoyed and forgotten than did patients who had moderate or short waits (means were 5.80, 2.88, and .91, respectively). Those waiting longest also evaluated the hospital less favorably than did the moderate and short-wait groups (means were 3.50, 4.20, and 4.48, respectively).

Patient estimates of their own waiting times were generally accurate, and perceived waiting time did *not* decrease with receipt of information, as expected.

However, a significant Information  $\times$  Waiting Category interaction was found ( $F(2,143) = 3.84, p < .03$ ). Post-hoc comparison of subgroup means showed that informed patients in the long-wait category rated the hospital *more* favorably than did uninformed patients in the long-wait category (means were 3.63 and 2.75, respectively).

### Private Patients and Hospital Newcomers

Other patient sub-groups who benefited from information were those who had arranged for private rooms, and those who had never been hospitalized before. In general, Private patients tended to be less satisfied with their hospital admission than were Semi-private and Clinic patients—probably because they were paying more for their rooms and expected better treatment. A significant Information  $\times$  Accommodation Interaction ( $F(1,131) = 4.39, p < .04$ ) revealed, however, that informed private patients rated the hospital as more concerned about them than did uninformed private patients (means were 3.55 and 1.31, respectively).

Previous hospitalization experience also interacted significantly with Information ( $F(5,171) = 3.25, p < .01$ ). A comparison of sub-group means indicated that informed hospital newcomers were more likely to report that the hospital had done something to ease their wait than were their uninformed counterparts (means were .76 and .27, respectively).

## DISCUSSION

Overall, the beneficial effects of information were most noticeable in patients' cognitive and overt behavioral responses. Evidence suggests that patients were not so highly stressed as to be unable to process the information they received—hence their greater familiarity with admitting procedures and environmental amenities. The link between cognition and behavior was manifested during registration and in the waiting period that followed by a decreased reliance of informed patients on other people for information and assistance.

The fact that fewer informed patients required the assistance of hospital personnel also represented a savings for the hospital, as it freed up more time for staff. Reduced patient demands meant that admitting tasks could proceed with fewer interruptions. Although no pre and post measures were used to assess productivity, anecdotal data confirmed that staff was more satisfied when they did not have to respond to patient questions that were repetitive in nature. Moreover, personnel from adjacent areas approached the researcher to request similar interventions that would facilitate their own operations.

Patient evaluations of the hospital tended to improve when information was available. Although the patient information package did not produce all the

positive responses expected, and can hardly be considered a permanent solution to problems of overcrowding and inordinate delays, still there was recognition on the part of informed patients that the hospital had at least tried to do something to ease their wait. Furthermore, those patients who were most critical of the hospital (private; waiting longest) or in greatest need of information (hospital newcomers), appeared to be mollified by the information provided, and gave more favorable ratings to the hospital as a result.

Wener and Kaminoff's predictions concerning the utility of signage were borne out [4], since neither the signs nor the additional written information seemed to benefit patients in the low-density condition, while high-density patients appeared to benefit from information by feeling less crowded. In keeping with the "social overload" explanation of aversive responses to density, we may assume that information can help structure and clarify the environment for people in stressful and high-density situations by reducing their attention to and reliance on social cues. The finding of reduced social dependency in the Information condition supports this conjecture.

Finally, the data on patient affect are inconsistent. Physiologically, the EKG readings of informed patients tended to show lower arousal levels than for the uninformed patients. (Although accelerated heart rate may be due to factors other than anxiety, e.g., medication, anemia, fever, poor physical condition, it is unlikely that any of these factors contributed to the differences between the two groups, since no significant differences were found between them with regard to diagnosis category). If informed patients were more relaxed, however, why weren't their self-ratings on affect scales more positive than those of the uninformed? It may be that people facing acute threats to life and limb cannot be expected to manifest gains in emotional state as a function of this type of information. In this setting, anxieties were related to fears about medical problems and personal survival, rather than to problems of orientation, which may explain why the enhanced emotional effects reported by other investigators failed to occur here. Subjects in Wener and Kaminoff's study were visiting prisoners, not going to jail themselves [4]; and those in Langer and Saegert's study were shopping in a supermarket [3]. Neither of these groups would seem to be experiencing the same level of stress as the patient population of the present study.

Work by Langer et al. showed that information *can* produce the desired emotional effects; however, the type of information and the way it was presented emerged as critical factors [2]. In that research, information was delivered *verbally* and *personally* to each patient, and focused specifically on the emotional adaptation of the individual to surgery and hospitalization. Coping strategies were introduced by the experimenter and then verbally rehearsed with the patient, in an effort to involve pre-surgical candidates in their treatment and recovery. This "cognitive control" technique has been very successful in reducing stress in a variety of situations, but is qualitatively very different from

the cognitive interventions used in the present study. What this suggests to researchers is that preparing patients for hospitalization by means of written material and information displays can produce gains in certain areas of patient functioning; however, in order to allay deep-rooted anxieties and medically-related fears, a more individualized, verbal information strategy might be required. Hospital administrators may find that a stress-reduction program for incoming patients would positively affect patients' emotional state and reduce the trauma of hospitalization.

Clearly, some intervention is needed at the entry level. Negative patient reactions, such as elevated heart rates and verbalized anger and distress, are indicative of the potentially damaging effects of a stressful admitting experience on patient health and psychological well-being. Hospital officials and medical personnel may want to reevaluate the primary functions of admitting (patient registration and testing), to take into account the therapeutic or non-therapeutic qualities of their procedures as well as the setting in which patients are introduced to the hospital. Factors such as noise level, comfort and adequacy of seating, and availability of orientation information warrant careful scrutiny in this context. The fact that a sizable portion of the patient sample felt much *worse* after their admitting experiences accentuates the importance of this area to medical functions and to the reputation of the hospital.

Further considerations and possible avenues of research involve the format and medium of information. Since patients who did not read the available literature in the informed condition were eliminated from the study, it was impossible to ascertain whether any benefits were to be derived from signage alone. Future investigations should contain a phased intervention component, so that the separate as well as collective effects of different information formats can be assessed. The diverse requirements of patients with different backgrounds, hospitalization experience and emotional needs, also pose a challenge. One can only speculate on the reasons patients had for ignoring the written materials available in the information condition: perhaps they were unable to read either English or Spanish; maybe they preferred to talk or walk around while waiting; possibly they did not want to know any more about the hospital and its procedures. The fact that so few Clinic patients appeared in the informed sample, although they comprised approximately 15 percent of the pre-intervention sample, suggests that socioeconomic and educational factors play a role in determining preferences for information. To ensure the widest possible audience, attention must be paid to the way information is packaged and the possible uses of other media. Television, because of its popular appeal and compelling format, might be an effective instructional tool. Its ability to distract and entertain could also prove valuable for those patients who do not want to think of what lies ahead. A small-scale study of patient responses to the introduction of TV in a hospital waiting area showed that patients interacted more and felt more relaxed when viewing a television program [15]. Other researchers have found that a

slide or film display can provide distraction and decrease viewers awareness of time [16, 17]. However, it is suggested that caution be exercised in implementing these media, since staff responses can negatively affect the success of such a project.

In conclusion, we know that information can play a significant role in ameliorating responses to conditions of density and stress. The explicit mechanisms by which these benefits are achieved remain elusive, and invite further experimentation with both form and content. As our theoretical understanding of cognitive and emotional responses increase, we will be better targeted to carry out interventions which make a meaningful difference in people's lives by giving them greater control over situations and settings which trigger negative and often harmful stress reactions.

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