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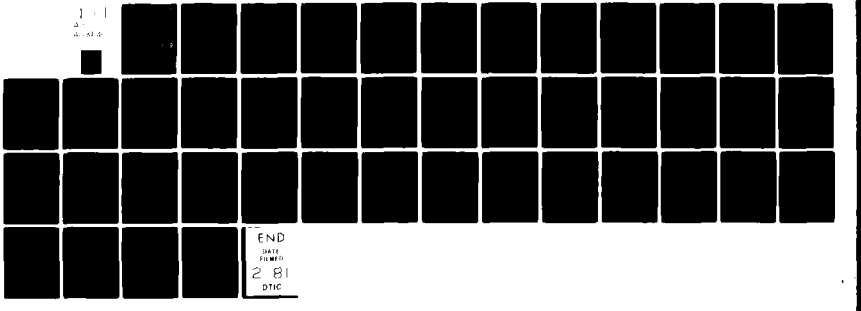

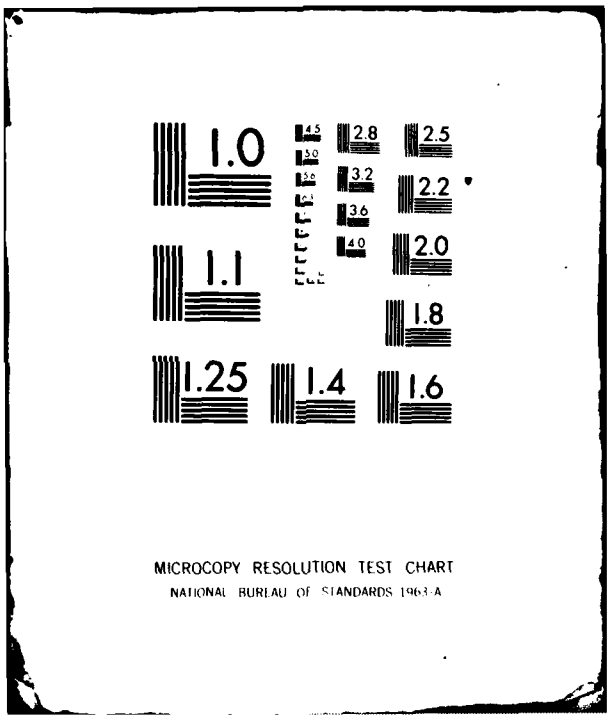
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This report focuses on crowding as a stress inducer. Incongruity Adaptation Theory (GIAL) is applied to crowding as a predictor of task performance and satisfaction. It is suggested that crowding may produce pleasant and unpleasant social and work environment conditions and may result in improvements or decrements of performance. The conditions which should produce each outcome are specified according to GIAL theory predictions. Joint effects of crowding and other stressors are considered.

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Stress and Incongruity Theory: Effects of Crowding

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It has often been argued that stress is one of the most destructive forces in any task-oriented organization. Moreover, as stress reaches severe levels, the total breakdown of purposeful functioning is often expected. Yet the observation of personnel working in stressful settings at times negates such assumptions. For example, it is documented that some military units have withstood high levels of stress without loss of much or any of their effectiveness. At other times, stress has indeed had disasterous effects. It is still not clear why stress sometimes does and sometimes does not have severely negative effects on performance and on satisfaction. Despite some excellent research efforts by a number of scientists, much needs yet to be explored about the relationship between stress and behavior.

Considerable research appears to be needed to determine how diverse stressors are similar or different in their effects on human responding. Further, we need to know more about how these stressor variables interact or co-act with each other.

But before we can talk or speculate about the joint effects of stressor variables, we need to better understand the effects which each stressor variable has separately.

In this report, we shall focus on crowding as a stress inducer. Certainly, crowding as a typical situation does occur during task performance in quite a few military settings. Under what conditions does crowding increase or decrease task performance? When would crowding produce a more pleasant interpersonal atmosphere and when would it produce a more unpleasant interpersonal atmosphere? When would personnel be more or less satisfied with their physical and social surroundings? Certainly, much research has attempted to answer these questions. Unfortunately, existing theory has difficulty explaining all of the resulting data via a single framework. It is even more difficult to integrate crowding theory and crowding data with other theories of stress (which are not specifically focusing on crowding). This technical report intends to develop a theoretical view about crowding as <u>one</u> among a number of other stressors in an integrated framework. It is hoped that such a theory will be useful to guide subsequent research on this contract and as a basis of further theory development in the area of stress effects on task performance and satisfaction in general.

During the 1960s and 1970s, an increasing number of psychologists have become interested in the effects of the environment on human satisfaction/dissatisfaction and on human behavior. One of the areas within the environmental framework that has attracted a particularly large amount of attention is the problem of crowding. As so many other areas of psychological theory and research, the psychology of crowding has - until recently - developed an identity of its own, typically utilizing its own terminology as well as its own set of theoretical and explanatory concepts. Only with the advent of more general concepts, such as the effect of perceived control, has there been a partial integration of crowding theory and research into the more general theoretical structure of psychology.

It is, indeed, not surprising that crowding researchers have worked somewhat separately from other social or general psychologists. Certainly, the responses of the human organism to the perception of being crowded appear on first view to be quite specific. If we observe the city dweller who is surrounded by a vast number of other persons in limited space, we may note that he will cut off contact with (less significant) others; apparently to maintain a satisfactory adjustment to his environment. Such a response seems to occur specifically in crowded settings. Responses to other potential stressors appear to be quite different. If the stressor were pain, for example, he might even seek contact to get help from others.

As scientists, however, we may not be satisfied to look at surface responses. Rather, we may want to ask what physiological or cognitive operations underlie the diverse responses we are observing. Is there a large number of specific stressors (many of which are potentially still unknown to science), all of which produce specific cognitive and physiologic functions that differ from each other? Is the organism capable of developing an infinite number of divergent reactions to all potential "stressors" that it might encounter? Or is it, in contrast, possible to find common denominators in human responses to various (and divergent) environmental and social stressors? Are there theoretical concepts that might explain dissatisfaction/satisfaction and behavior in response to a wide variety of environmental and social stimuli including crowded settings?* We believe that such widely based underlying physiologic and cognitive mechanisms can and do exist. These mechanisms might respond in similar ways or the same way to various stressors from diverse experiential content areas including to crowding stress. The general responses to the various stressors should be quite similar, even though specific response may, in part, be mediated by the appropriate response to the specific stimulus.

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*Such a theoretical concept would have to (1) be able to explain contradictory findings within a single theoretical framework, (2) predict and explain responses to opposite ends of experiential dimensions (e.g., both density and isolation), and (3) predict and explain responses to diverse experiential dimensions (e.g., crowding stress and stress due to interpersonal conflict) within a single theoretical framework.

This chapter attempts to integrate the density/crowding paradigm into the more general framework of human responding to congruity. It is based on the General Incongruity Adaptation Level (GIAL) theory advanced by Streufert, Streufert and Driver (1978). The theory was initially proposed to integrate the previously conflicting consistency and information search theories. It appears that GIAL theory is useful to explain and predict human responses to situations involving density as well.

Density and Crowding

Early researchers in the developing field of human crowding did not distinguish between the physical condition of density (the number of persons per unit space) and the psychological response to some high density conditions (the unpleasant experience of feeling crowded) (c.f., the reviews of the crowding literature by Altman, 1978; Streufert and Nogami, 1979). Recent research has clearly demonstrated that density and crowding are related but are by no means the same (c.f., Stokols, 1972). Density can, but need not, produce crowding. In some cases density even produces positive affect. Much seems to depend on how a person placed in a dense situation would define that situation. For example, most guests at a cocktail party are not likely to view themselves as particularly crowded. Yet if the same number of persons are brought together in equivalent space to work on a task, they would

probably experience crowding stress. In other words, additional factors must come into play together with density before the perception of being crowded is likely to occur.

But even the density concept may require some further scrutiny. Density is a ratio of number of persons (group size) and space available (room size). Is crowding, when it does occur, produced by the size of the crowd, the size of the room, or by the interaction (ratio) of the two, i.e., density? Some researchers (e.g., Nogami, 1976) have demonstrated that room size and group size appear to have much more potent effects separately than they do together. Further, other factors (e.g., sex, task, expectations and more) seem to have additional effects. Obviously, our task of explaining the human perception of being crowded is not made easy.

A number of researchers have attempted to explain the differential human responses to situations in which a large number of persons are temporarily or more or less permanently placed in limited space. When can one expect that the dense situation will result in positive affect, when will the affect be neutral, and when will it be negative (crowding)? Several quite divergent explanations have been advanced. Crowding perceptions have been ascribed to task orientation, to loss of control, to insufficient privacy, to conflict over resources, to general affect arousal and other factors (e.g., Altman, 1975; Baron and Rodin, 1978; Baum and Valins,

in press; Worchel and Teddlie, 1976). However, with the exception of the loss of control explanation, all of these concepts seem more or less descriptive rather than analytic. It appears that crowding occurs when people experience difficulties in addition to the perception of density (or a large number of persons present, or small room size). On the other hand, there appear to be factors which mitigate the feelings of crowdedness despite high density levels. Baum and Valins (in press) have clearly recognized this phenomenon. They state that "whether or not stress is experienced is dependent upon mediation by situational and psychological variables."

A more extensive look at the statements of Baum and Valins (in press) might be quite instructive. They state:

> As available space decreases or as the number of people in a constant amount of space increases, density increases. Increasingly high density is accompanied by a number of potential constraints, inconveniences or threats (such as interferences with ongoing activity, social overload, reduction of available privacy, or restriction of behavioral freedom). However, these problems are not always salient when density is great; physical or social structure can minimize interference and overload in a high density situation. By organizing behavior, by providing norms and expectations governing interaction, or by reinforcing control over social experience, structure such as that associated with group development may allow people to live and work under high density conditions without discomfort and stress. These intervening variables can reduce the salience of density-related problems by mitigating their effects and reducing the likelihood that they will be perceived as inconvenience or threat. If high density does not pose problems for people, it is unlikely that crowding will be experienced. If, on the other hand, problems associated with high density are salient, crowding is likely.

We will return to this statement of Baum and Valins later in this chapter. For now we would like to agree that (1) density and crowding may be related, but are far from identical, and (2) whether crowding is perceived appears to depend on a number of variables and is based on a number of different experiences (we shall call them domains) with which a person in a potentially dense situation must deal.

At this point, let us return to the question we raised earlier. Can some more general underlying theoretical framework be found that would help us explain how the various situational and psychological variables operate to determine whether crowding stress does or does not occur? The next sections of this chapter will address that question directly.

GIAL Theory

The General Incongruity Adaptation Level

Streufert, Streufert and Driver (1978), based on previous conceptualizations of Driver and Streufert (1966) and Streufert and Driver (1970), have proposed a General Incongruity Adaptation Level Theory. Since space is limited, only a sketch of that theory can be presented here. The interested reader is referred to Streufert and Streufert (1978) pp. 163-206. Streufert, et al. state that persons experience levels of incongruity throughout their lives. As a result, they become accustomed to particular levels of social and non-social incongruity that are more or less "typical" for their day-to-day experiences. As long as

changes in incongruity over the years are slow and moderate, the person is likely to adapt to a modified incongruity level: he will expect that his environment will present him with typically similar incongruity levels tomorrow as well. Sudden changes in incongruity in either direction (toward lesser or more incongruity) or extreme (continuous) levels of incongruity cannot produce sufficient changes in adaptation. The person will find that currently existing incongruity levels are either below or above the incongruity level to which he or she has adapted, i.e., below or above his GIAL.

When experienced incongruity departs from the GIAL (and it does to some degree and for short periods much of the time), the person will engage in activity to recreate experienced incongruity levels at or near his GIAL. In other words, the person is motivated to maintain a level of incongruity in his environment that would match his expectations (expressed in the level of his GIAL).

Congruity and Incongruity

To be able to make precise predictions, Streufert, et al. introduced a number of new concepts from social and cognitive psychology. For the present purpose, a distinction between the concept congruity-incongruity and the concept consistency-inconsistency is of particular importance and will be reviewed here. According to these authors, congruity

occurs when information received by an organism does not in any way depart from the organism's cognitive frame of reference for the situation. In other words, information received contains zero novelty and permits utter simplicity of storage. It typically does not require a response, or may lead to a well-practiced response. On the other hand, incongruity occurs when information received by the organism is in disagreement with one or more stored concepts (or desires) of the organism, and requires manipulation of stored concepts, of information or of the environment before congruity can be established. (It should be noted that this definition of congruity-incongruity does not differ substantially from the original definition employed by Osgood and Tannenbaum, 1955).

Consistency and Inconsistency

Consistency, on the other hand, is viewed by Streufert, et al. in the sense implied by McGuire (1968) who regards consistency as an orientation toward the familiar. What, however, is familiar? According to Streufert, et al. we are all familiar (i.e, continuously exposed to) with a certain amount of incongruity. This is the incongruity level to which we have adapted, the incongruity reflected in the GIAL. Any change from the familiar incongruity level is consequently inconsistent (with expectations). If it is correct that during its life the organism has always experienced some degree of incongruity in its environment, then the sudden absence of (or decrease of) incongruity would be just as

inconsistent with expectations as a sudden increase or continuously very large amount of incongruity that exceeds the GIAL.

Inconsistency, in other words, refelcts any (substantial) deviation of incongruity from the GIAL, either in a more or in a less incongruous direction. The amount of inconsistency experienced by a person is reflected by the extent of the discrepancy between experienced incongruity and the person's GIAL. Consistency would be obtained when the experienced incongruity level matches the GIAL.

We need not emphasize that the amount of incongruity typically experienced by different people would vary. Certainly, persons growing up in one culture might experience considerably divergent incongruity levels from those in another. However, even within a culture or even within a family incongruity, experiences are likely to differ from person to person. As a result, each person can be expected to develop his own incongruity adaptation, and people would differ in the amount of incongruity in their environment which they would try to maintain.

Specific Incongruity Adaptation Levels (SIAL)

The experience of incongruity over time would, however, not only differ in degree. Some individuals may experience more incongruity in one area of experience (what we shall call domain), others may experience more incongruity in

another area. As a result, individuals would also vary in the domain specific incongruity levels which they might expect. Streufert, et al. have called these specific adaptations SIALs, i.e., Specific Incongruity Adaptation Levels. It is assumed that a person will develop an SIAL for each domain of incongruity to which he or she is repeatedly exposed. If the person has experienced little incongruity in that specific domain, then the resulting SIAL is likely to be relatively low. If he has had repeated experiences with considerable incongruity in that specific domain, then the resulting SIAL is likely to be relatively high. In other words, a moderate amount of incongruity in some specific domain might be inconsistent for both a person with a relevant high and a person with a relevant low SIAL, but for quite different reasons. While moderate incongruity might be inconsistent because it represents too much incongruity for a person with a low relevant SIAL, it may be inconsistent because it represents too little incongruity for the person with a high relevant SIAL. An example might be useful. For a person who never fights with his spouse, a sudden fight might be a serious problem, even it if is minor in nature. For him this may signal that the relationship is in deep trouble. On the other hand, for the person who is accustomed to serious fights, the minor fight may also be inconsistent: he or she may wonder why the spouse is not fighting back to the usual degree. Is it a sign of disinterest in the relationship, or is there some sinister

strategy behind it? The perception that the relationship is in trouble is the same, but the perceived reason for it differs on the basis of each person's SIAL.

Streufert, et al. assume that the various SIALs interact with each other. One might conceive of them as "adding" or "averaging" into the GIAL which would reflect overall incongruity adaptation. Affect and behavior would not be as much a function of a specific SIAL, rather it would be influenced by the more general mechanism: the GIAL. One of the functions of the GIAL is to allow individual fluctuations in congruity around SIALs. In other words, excessive or less than optimal incongruity might be tolerated by an organism in a particular domain as long as the average amount of incongruity across domains is maintained at or near the GIAL. As such, the GIAL is an adaptive mechanism: it permits the organism to deal with an excessive amount of incongruity to which it is exposed and it allows the organism to attempt to modify that incongruity without experiencing stress.

Dealing with Specific Incongruity Levels Via the GIAL

The GIAL permits a person to deal with abnormal incongruity levels (for specific domains that are below or above their respective SIALs) by modifying incongruity experience in another domain. The latter domain would, of course, have to be under the person's control. For example, a person might compensate for a particular low incongruity

experience in one domain by increasing incongruity in another domain. If his relationship with his partner bores him because there is nothing new and surprising (incongruous) in the experience, he may search for a person with whom to have an affair - something that would indeed produce increased incongruity. While the current incongruity of his home life may remain well below the SIAL he had previously developed in that domain, the rather high (above SIAL) incongruity from his affair might compensate, so that average incongruity is maintained near or at the GIAL. Stress associated with average incongruity that is highly inconsistent (widely discrepant from the General IAL) would consequently be avoided (c.f., the section on the GIAL and Affect, below).

If, on the other hand, the person experiences excessive incongruity in one domain (above his SIAL) he is likely to try to reduce incongruity in other domains, to be able to cope. Again, an example might be helpful. If Mr. Jones finds that his job is threatened by a particularly fierce and competent competitor, an event that would be highly incongruent if he previously deemed his job secure, he would not be likely to respond or cope very well when he comes home in the evening and finds that Mrs. Jones wants to talk to him about the serious problems their son, Johnny, is getting into at school. He might respond: "Please, I am having enough problems as it is now. Please don't bother

me with that. Just do as well as you can with him. As soon as I am through with the problems I have at the office, I'll help you deal with that." In other words, an increase in incongruity beyond the SIAL in one domain (e.g., at the office) requires decreases in incongruity (a calmer than usual domestic environment) in other domains.

Responses to Levels of Experienced General Incongruity

Unfortunately, people are not always able to modify their lives in particular domains to make up for increases or decreases in incongruity elsewhere. How does an individual respond if the average incongruity which he experiences departs from his GIAL, i.e., how does he deal with an environment which is inconsistent with his expectations? It is assumed that the kinds of actions an individual experiencing inconsistency would take should depend on: 1) the direction of inconsistency in relation to his GIAL, and 2) the degree of the inconsistency. Moderate amounts of inconsistency <u>above</u> the GIAL should lead to "cloze actions." These are more or less "rational" attempts to decrease incongruity. The relevant mechanisms have been well described and documented by consistency theory and research (e.g., Festinger, 1957, and others). Moderate amounts of inconsistency reflecting experienced average incongruity <u>below</u> the GIAL should lead to complex information search processes of the kind documented by theorists concerned with novelty and variety seeking (e.g., Berlyne,

1950; Maddi, 1961). Extreme amounts of inconsistency below the GIAL (including lesser discrepancies that defy resolution over extended time periods) should result in less adaptive responses: boredom, dependence on externally provided information, simple and undifferentiated search for information or engagement in dangerous activities that would serve to drastically and immediately raise incongruity levels. Extreme inconsistency levels above the GIAL should also produce less adaptive responses. Here we may initially expect reactance and aggression, followed (if high incongruity is not reduced) by escape, distortion of perception, and apathy. Certainly, the various response tendencies to various levels of incongruity at various points on the incongruity scale might overlap with each other. It is quite likely that adjacent mechanisms might combine to some degree or another in the attempt to reestablish and maintain incongruity at or near the GIAL. A visual representation of these mechanisms is provided in Figure 1.

The GIAL and Affect

So far we have dealt with cognition. However, Streufert, et al. assume that the various cognitive operations we have discussed are also associated with specific affect. Positive affect as well as negative affect and stress experience are assumed to relate specifically to a person's GIAL rather than to any SIAL. Different degrees of discrepancy from the GIAL (different degrees of inconsistency) would be

The implications of GIAL theory are, however, considerably broader than consistency and information search theory. We shall apply the GIAL concept to density and crowding in this chapter.

The GIAL and Crowding*

Cocktails and the Work-Setting

Let us return, for the moment, to the previously discussed difference between physical density and perceived crowding.** If a person finds himself in a dense (many persons per unit space) situation, to which component of the situation is he or she likely to respond? And what kind of response is it likely to be? Any dense setting probably contains many specific component characteristics. The number of persons present as well as the size of the room in which they are present will probably have separate

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*For the purposes of this chapter, we shall ignore GIAL as an individual difference variable, although there is evidence that preferences for the degree of incongruity provided by interpersonal distance can affect experienced (physiological) stress, mood and performance in dense settings (e.g., Aiello, De Risi, Epstein and Karlin, 1977; Dooley, 1977). Further, we will not be concerned with cultural differences in incongruity perception and incongruity adaptation, although such differences would likely produce quite different responses to density (c.f., Schmitt, 1963; Mitchell, 1970, 1971).

**Crowding is here meant to represent an unpleasant state associated with density and/or other variables. It is not to be confused with personal space (e.g., Altman, 1975; Duke and Nowicki, 1972; Goffman, 1971; Sommer, 1969) and with privacy (e.g., Westin, 1967; Proshansky, Ittelson and Rivlin, 1970). From the view of the present authors, these concepts would reflect specific domains within which density interferes with expectations and produces specific domain relevant incongruities.

effects (c.f., Nogami, 1976), and there are other important aspects as well. The person may have to interact with others, or he may merely have to coact. He may view the others present favorably or unfavorably. He may or may not have to attend to information. He may expect to spend little or a considerable amount of time in the dense setting. He may or he may not have expected density to occur. The room in which he is placed with others may be comfortable or uncomfortable. One may go on and on describing potentially important aspects of the dense situation; for that matter, a number of theorists and researchers concerned with crowding have listed several more. There are behavioral constraint, overload, interference, interpersonal demand, physical discomfort, absence of privacy and many more (e.g., Freedman, 1975; Schopler and Stockdale, 1977; Sundstrom, 1975; Saegert, 1978; Stokols, 1972; Streufert and Nogami, 1979).

All the different aspects of the environment a person is experiencing (in unique fashion) would reflect <u>separate domains</u> of his physical and social environment, domains with which he has more or less previous experience. For some of these domains, he may have developed a high; for others, an intermediate; and for still others, a low SIAL. Obviously, the density as such which he is experiencing probably reflects only one of these domains. Typically, however, density is associated with experiences in other

domains as well (e.g., social demands, information, etc.). With various incongruity levels across the specific SIALs in these various domains, what kind of experience can we expect this person to have? Let us follow and observe him in two quite different dense situations. Let us say that he is attending a cocktail party. Certainly the density he is experiencing there is somewhat familiar to him. It may still be incongruous, but other components of the setting probably are not. He has gone to parties like this one many times. He has expected to touch elbows with others. The conversations are not particularly incongruent; if anything, the opposite. One agrees that the weather is beautiful and that the party is nice. One has the same political and economic views. Nothing new, different, unexpected is happening. As a matter of fact, the party may have turned out to be boring (despite the incongruous density), if he would not have been able to flirt with the hostess, a rather incongruent experience in the presence of the host. In any case, the excessive incongruities from domains representing density and the flirt may have maintained (in the presence of too low incongruities in other domains) the average incongruity near his GIAL. As a result, our visitor did not feel crowded despite the dense situation. If, however, another guest would have involved him in a loud argument, he may have experienced incongruity above the GIAL. He might have felt that there were too many

others listening close by: he may have felt crowded or may have complained about loss of privacy.

But let us move our cocktail party guest into another setting. Let us say that we find him in his office. Suddenly, many people are entering his office - about as many as occupied the same amount of space at the party. Now he may well be quite disturbed. The constellation of specific relevant domains is different here; different SIALs are involved. He does not expect so many people to stand around where he works. He cannot get his work done. He feels uncomfortable if people look at the paper on which he is writing. The experience is unfamiliar. He cannot predict the people around him. Even if he should decide to stop working for the day and turn the presence of all the others into another party, he would probably continue to be uncomfortable. He is experiencing excessive levels of incongruity in too many SIAL domains to reduce average incongruity to levels at or near the GIAL. The situation is simply too unpredictable, too novel, too unfamiliar.

Reducing Incongruity

If an individual wants to "cope" with the "stress" that is produced by incongruity levels above his GIAL, he has to attempt to reduce that stress. This would hold for all settings in which stress due to incongruity overload is experienced, including settings involving density. Incongruity

reduction attempts should occur across a number of cognitive domains; after all, it is average incongruity at or near the GIAL that produces positive affect and successful coping. Nonetheless, we should be able to observe the greatest amount of attempted incongruity reduction for the specific cognitive domain where incongruent stimuli exceed the domain SIAL to the greatest degree (unless there are specific intentional or external reasons for maintaining the incongruity level in that domain or for decreasing incongruity in other domains).

We can, in other words, expect some specificity of incongruity reduction activity. For example, if we raised incongruity by increasing the number of persons in a given space, we would expect the major (but often not the only) incongruity reduction activity to be directed toward warding off social input, gaining control over one's own limited space, gaining control over other persons, and so forth.* If we were overloading a person in a more or less dense situation with social input, we would expect him to shield himself from others, decrease the frequency and depth of interaction with them, or even to withdraw emotionally.

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*In addition, one might expect that increasing the number of persons present, as opposed to decreasing space, may result in more experienced incongruity and greater perceived crowding. This effect should be produced by the greater number of incongruent domains associated with more persons as compared to less space.

Apathy of the bystander in times of danger fits into this framework. If, on the other hand, we decreased the size of the room in which he is interacting with others while keeping the number of others constant, we would expect his major activity to be directed toward obtaining or controlling space. This response may, however, be modified by the sex of subjects, since research has shown that women and men respond quite diversely to room sizes (e.g., Freedman, 1975; Nogami, 1976; Ross,Layton, Erickson and Schopler, 1973; Stokols, Rall, Pinner and Schopler, 1973). Should the person fail to resolve the experienced incongruity via action in the specific domain where excessive incongruity is experienced, we would expect him to increase his efforts in other domains as well (i.e, those domains in which previous attempts at *incongruity* reduction were less strong). If this effort is effective, a perception of being "crowded" would be avoided or mitigated, or would cease.

Crowding and Affect

We have just stated that excessive incongruity due to density and other related stimuli could produce crowding. The degree to which density exceeds the adaptation level should determine the kind of response and the presence or absence of experienced crowding. We would propose that the incongruity a person is experiencing beyond his GIAL will be reduced via cloze actions if that is possible; that is,

if the incongruity is not extreme (e.g., via dissonance reduction, direct action on the incongruent stimulus, etc.). In other words, as long as the domain relevant stimuli associated with density can be handled by modifying them, by reducing incongruity elsewhere and so forth, the person should not experience stress. He is successful in his attempts to cope; affect is likely to be positive to neutral.

If excessive density (incongruity in the various domains associated with limited space and large number of persons) persists across several of the associated SIALs, if the person is unable to compensate for the average increased incongruity, or if other experienced incongruities from SIALs that are unrelated to density are excessively high in addition to the dense conditions, we would expect an entirely different response. Extreme incongruity above the GIAL should be associated with negative affect. This affect, in the presence of density, would be perceived as "crowding." Attempts to cope in this incongruity/affect range are likely to be maladaptive in a general sense (but not necessarily ineffective in reducing concurrent levels of average excessive incongruity). Initially, we might expect reactance/aggression against the sources of the stimuli (against persons as well as the setting). If the aggression is ineffective in reducing the excessive average incongruity, or if it has been frequently ineffective in the past, or is not permitted, the person may sooner or later

engage in other kinds of coping attempts. We would now expect possible expressions of fear and anxiety together with the development of withdrawal and apathy. If possible, the individual might (physically or emotionally) escape. Which of these actions would occur and what the precise sequence might be should, to some degree, depend on the specific domains where incongruity is perceived at excessive levels. Nonetheless, all of these responses to extreme excessive incongruity should be accompanied by negative affect; and as long as density is maintained, should produce the perception of being crowded.

Effects of Exposure to Density Over Extended Time

A person who experiences density for extended time periods (e.g., residential crowding in a ghetto) may, after some time, come to expect the dense setting. If he has grown up in that or an equivalent setting, i.e., if his entire life experience has involved extreme density, then excessive incongruity may not be generated (although incongruity due to other events associated with density might be elevated). The person who originally came from less dense surroundings will be aided by time and resulting adaptation: the density SIAL and other relevant SIALs will be raised. Yet the adaptation may never be complete (although it is probably more likely to be complete in time if the person's culture mitigates the incongruity produced

by density, as occurs in certain oriental societies where intentional focus on other low incongruity domains is culturally encouraged, c.f., the research of Schmitt, 1963).

In other words, adaptation to extreme incongruity is not always achieved. We would suggest that mechanisms associated with both the severity and the continuity of density may be involved in preventing complete adaptation in some cases. These mechanisms may in part be physiological. Alternatively, an individual's attempts to cope with extreme incongruity levels (including attempts to cope with continuous severe density by persons who are not adapted) may prevent sufficient future adaptation. For example, a person who chronically withdraws into himself in the presence of many others effectively decreases the incongruity to which he is exposed. Since there is less incongruity to adapt to, he will necessarily reach a lower adaptation level. If his environment remains dense in the future, he will continue to be exposed to excessive incongruity, and he will probably continue to use withdrawal as an - albeit maladaptive - coping mechanism.

Let us take a more general look at the possible coping mechanisms of persons exposed to high residential density. As would be the case in situations of temporary density which we discussed earlier, the person involved may attempt to gain some relief from the crowding he perceives by

attempting to reduce incongruity in one or more domains (wherever that is possible). For example, he may attempt to limit his interaction to persons he knows well, whose habits and opinions are familiar, i.e., persons from whom he is not likely to receive particularly incongruent inputs. He may seek membership in groups that provide a predictable social environment, groups that accept only those as members who behave in a fashion that is congruent with group norms and group expectations. Such groups would reject outsiders who are "different" (i.e., are sources of incongruity).

Strategies of this kind may be helpful, but they may yet be insufficient in settings of considerale residential or other long-term crowding. Several other social or environmental incongruities associated with the dense housing situation may well remain. Efforts to reduce the incongruities in at least some of these domains, first via cloze actions, then possibly via aggression and/or denial, withdrawal and escape often do not work. In other words, the person is failing in his attempts to reach an incongruity level at or near his GIAL - and this failure is persisting. Initially, the failure experience itself may be unexpected as well; and consequently itself incongruent, adding to the already existing incongruity (see a more detailed statement in the next section). As a result, negative affect (stress experience) would once again be on the rise. The more extreme attempts to cope would continue (aggression, denial, withdrawal, escape) and would possibly become habitual.

Withdrawal and escape (e.g., from social contact), if practiced over long periods of time, may well generalize from one situation to another and from one domain to another. For example, the person unable to cope satisfactorily (reduce incongruity toward his GIAL) with long-term residential crowding, may learn to avoid social contact in any setting where some incongruity might be produced, i.e., in situations where interactions with other unfamiliar (and consequently unpredictable) or unpleasant persons may be involved. (This learned withdrawal, across a number of situations and domains, is not unlike a generalized learned helplessness phenomenon.) If additional domains have been involved in the person's unsuccessful attempts to cope with average incongruity which is far above his GIAL, the maladaptive responding may even extend to these domains (c.f., the research of Sherrod, 1974; and Rodin, 1976).

Supporting Research

So far no data have been collected to specifically test the applicability of GIAL theory to density and crowding. However, a good amount of research has indirectly dealt with the questions we have raised (c.f., Streufert and Nogami, 1979, for a summary of a number of such studies). To conserve space, we will mention only a few of the relevant data here.

It has now been clearly established that density and crowding are by no means the same phenomenon. Crowding as we have stated, may or may not be perceived in a dense, setting; for that matter, it can even be perceived in settings that do not involve density. In other words, other variables must interact with density before crowding occurs (and these may even act alone). The crowding phenomenon, in other words, is complex. Indeed, as we have suggested above, there are a number of variables that have been identified as contributors to crowding. First, there are domain specific effects of group size and room size (e.g., Emiley, 1974; Nogami, 1976; Paulus, Annis, Seta, Schkade and Mathews, 1976; Schettino and Borden, 1976). Other variables have been identified in studies of residential crowding with college students (e.g., Aiello, Epstein and Karlin, 1975; Baron, Mandel, Adams and Griffin, 1976, Baum and Valins, in press). Crowding is intensified when problems are generated in the social interaction domain among residents of dormitory rooms. In double occupancy rooms which have been extended to three person occupancy, the perception of being crowded increases if one of the three occupants is "left out" of social interaction. From the present point of view, we are dealing with excessive incongruity in two (or more) domains: density and social interaction. This doubled incongruity

places an additional burden on the balancing process represented by the GIAL. If the density cannot be mitigated and if the exclusion of one of the triad members persists, negative affect and consequent crowding perception would become more likely. The potential consequence might be withdrawal and unwillingness to engage in any social contact, including an unwillingness to intercede when others are threatened (e.g., Latane and Darley, 1969).

A number of other studies -both in residential and in laboratory settings - have produced similar data: the addition of one or more unexpected and/or undesired problems (incongruities) to the existing problem of density has tended to increase the "crowding" that subjects have experienced: exactly what GIAL theory would predict. On the other hand, experiences which would serve to decrease incongruity in some domain (e.g., the presence of similar others or friends) has tended to decrease crowding experience (again as one would predict from GIAL theory). Examples for the interactive effects of density with other variables can be found in the review of Baum and Valins, in press.

Research which has measured the general effects of density on behavior is, of course, of interest to those concerned with an application of GIAL theory to crowding. The theory would predict no experienced crowding due to density as long as the incongruity associated with excessive density is mild and can be handled via cloze actions,

i.e., as long as incongruity due to density and other domains does not exceed the GIAL by a large amount. On the other hand, as density levels contribute to highly excessive incongruity, aggression, withdrawal and escape (negative affect) associated with perceived crowding would be expected. The fact that some researchers have obtained perceived crowding while others have not would fit well into the GIAL framework. Even the responses to crowding when it does occur (e.g., shifting one's body position in relation to others, reducing contact and limiting social input - c.f., Aiello 1977) fit well with the predictions of GIAL theory.

Crowding, Control and the GIAL

Several concepts that are intended to explain the crowding phenomenon have been advanced. We will utilize what may be the most promising concept to date to show how other explanations of the relationship between density and crowding and their effects may fit quite well into the GIAL framework.

A number of writers have recently proposed that the perception of crowding occurs when a person exposed to a dense situation cannot control the events that are leading to or that are maintaining the dense situation (e.g., Altman, 1975; Baron and Rodin, 1978; Baum and Valins, in press; Stokols, 1978). The value of the control hypothesis

is its greater generality, i.e., the link it provides among several areas of theory and research in social psychology. Absence of control has been utilized to explain or predict helplessness and withdrawal (Seligman, 1975), lacking ability to adapt (Glass and Singer, 1972, Janis and Leventhal, 1968; Rodin, 1976), reactance (Brehm, 1966) and aggression. The reader will have noted that these phenomena are all specific to what GIAL theory predicts* as the coping mechanisms for incongruity levels that are well above the GIAL. How then does the absence of control contribute to producing highly superoptimal incongruity levels?

Let us take a closer look at the concept of control itself. Control appears to mean (although it is not always defined in the same way) that an individual is able to respond to a stimulus so that a given problem is ameliorated. In terms of GIAL theory, control could mean at least two things: 1) the organism exposed to excessive incongruity in one domain is able to reduce incongruity elsewhere to maintain average incongruity at or near the GIAL, or 2) the

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*A special note on reactance may be necessary. We would view reactance as a form of aggression that is generated when a person is unable to reduce domain specific incomformities that are presented by a stimulus situation and remain incongruous despite attempts to engage in domain specific cloze actions. Reactance would occur to non-social as well as social stimuli: smashing the nail (or the wall) when the nail does not go in as intended is quite similar to the aggressive or non-cooperative acts engendered by a degree of density that prohibits normal activity.

organism is able to reduce superoptimal incongruity by coping mechanisms, e.g., cloze actions (of course, the opposite but equivalent process would imply control, if experienced incongruity were suboptimal). In other words, control means dealing with incongruity (either via search or via cloze actions) successfully. Since either of these methods would maintain (or modify) the average incongruity levels at (or toward) the GIAL, no negative affect should be produced. The organism in control is coping successfully. He is not stressed and does not experience crowding. Lack of control, on the other hand, would suggest that the person's average experienced incongruity exceeds his GIAL considerably.* His attempts to cope by reducing specific incongruities within SIAL domains are either not successful or are insufficient (because there are too many domains containing excessive incongruity in relation to domains containing less than optimal incongruity levels). The person is forced into response modes which are not adaptive, which may not affect the experienced situation in the intended fashion. The lack of success in reducing experienced extreme average incongruity may even produce helplessness, i.e., giving up the fight. Baum and Valins (in press)

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*Alternatively, lack of control could imply that the person's experienced average incongruity continues to remain considerably below his GIAL. In either case, the person is exposed to continuing experienced inconsistency. For simplicity's sake, we will not dwell on lack of control due to incongruity experience below the GIAL (one form of inconsistency). The reader should, however, be aware of that possibility.

describe this phenomenon as follows: "Crowding may interfere with people's abilities to predict social events and choose among response options, and may affect one's perception that outcomes are contingent on behavior." Lack of control, i.e., the inability to establish correspondence between intent and the consequences of one's actions (c.f., Baron and Rodin, 1978), reflects, in our view, the inability to reduce average incongruity to a level at or near the GIAL.

If lack of control is experienced, negative affect would be generated. A person placed into a highly incongruous dense situation who is unable to reduce the extreme incongruity across the various relevant domains (lack of control in these domains) would experience stress and would perceive himself as crowded. This perception would be an expression of the negative affect reflecting the fact that general incongruity is remaining well above the level of his GIAL. But why would the expression of the negative affect be "crowding" and not some other unpleasant experience related to some other domain?

We have already stated that responses to extreme general incongruity would likely be specific to the domain where incongruity particularly exceeds the relevant SIAL, i.e., the domains where attempts at control are least successful. Here the most significant domain may well be density, resulting in the specific crowding perception. However, the mechanisms which we would expect to be

associated with highly superoptimal incongruity should be similar, no matter whether the subject expresses his discomfort as "crowding" or as some other phenomenon: we would be able to observe reactance, aggression, withdrawal, escape, etc. All of these responses and the negative affect would reflect some kind of loss of control: as stated above, absence of the ability to control implies, in our view, all situations in which a person is unable to reduce averaged incongruity levels to the vicinity of his GIAL. In other words, crowding is only one of the stress experiences that are explained by GIAL theory.

So far we have viewed "loss of control" or "lack of control" as a purely descriptive term. However, the inability to control events in one's environment may have mechanism functions of its own; functions which are separate from the descriptive characteristics we have considered so far. There are at least two ways in which control may relate directly to the level of incongruity.

As people grow up, they gain increasing control over their environment. At the same time, they gradually escape from some of the control others wield over them. In other words, individuals adapt to various increasing levels of self control, and expect to maintain such levels of control over their social and non-social environment. If a subject in a crowding experiment, who is already experiencing excessive incongruity on a number of density-related

dimensions, finds himself no longer in control (i.e., he cannot leave or modify the dense situation), the incongruity due to absence of control may well bring the total experienced incongruity level far above the person's GIAL, resulting in elevated crowding stress. On the other hand, if the incongruity experienced by a person is generally below the respective SIALs across a number of domains, then elevated incongruity in the control domain may even be experienced as pleasant, because it would aid the person in establishing experienced average incongruity at or near the GIAL.

So far we have focused on incongruity produced by lack of control as an unexpected and unfamiliar situation. But additional incongruity could be added in another way when control is lost. This incongruity would be generated if a person finds that his accustomed ways of dealing with an unpleasant situation (e.g., density produced crowding) fail to bring relief. If a person experiences an average incongruity level above his GIAL, he is likely to engage in cloze actions. Past experience would suggest to him that these actions should be effective. For example, he may attempt to reduce dissonance about the density he is experiencing. He may try to persuade himself that the density is not so bad after all, because he is dealing with nice, friendly people whom he likes and with whom he does not mind being close together (Festinger, 1967, would say

he has just added a cognitive element to reduce dissonance). Since, however, the others present in the dense setting also experience crowding stress, they are not likely to act "nice and friendly," frustrating the attempt to engage in successful cloze actions (dissonance reduction). Additional incongruity would likely be generated because of the lack of success with cloze activity, again adding to the total experienced incongruity level, and carrying the person closer to extreme incongruity experience and its consequences. As a result, the person affected should be more likely to engage in the response tendencies that we have associated with extreme superoptimal incongruity. We might expect escape actions where possible (withdrawal, sitting away from the center of the group, erecting real or imaginary barricades, etc.).

There are some conditions that may either increase or decrease the amount of control a subject has over the dense situation within which he must function. From the present point of view, we would consider these to be conditions that allow him to either decrease the amount of incongruity he experiences, or would continuously frustrate his attempts to remove excessive incongruity. Let us consider one example of each kind.

Some experimenters have let their subjects know in advance that they would experience crowded conditions. We

would expect that this advance knowledge would produce some superoptimal (anticipatory) averaged incongruity. In other words, the subject in this experiment should provide the experimenter with some measure of increased "crowdedness." However, the subject is also able to decrease the effect of the density by engaging in advance incongruity reduction activities; for example, sitting near the edge of the anticipated group and so forth. Further, since he expects a large group to arrive, its presence later is no longer as unexpected and, consequently, not as incongruent. Nonetheless, there should still be levels of incongruity in other domains that raise the averaged incongruity level above the GIAL. But, average incongruity would not be raised quite as far for the subject who is told in advance what he might expect in comparison to the subject who was not told in advance. As a result, the measured crowding responses for subjects with advance knowledge should be lessened.

For an example of the effect of lack of control in a situation where the person would want to remove or decrease continuous excessive levels of incongruity, let us turn to the relationship between residential crowding and incongruity, a relationship we have already discussed earlier in this chapter. How does control relate to long-term crowding? One might expect two somewhat contradictory effects of long-term exposure to residential density. To some degree

density would become less stressful as the SIALs associated with crowded living conditions would rise somewhat with continued high levels of incongruity in these domains. There is evidence for this effect: we know that persons from rural areas are initially quite disturbed by density in cities, but adapt (somewhat) after experience over time.

As we stated earlier, adaptation may not be complete if density is continuous and severe. In any case, the GIAL cannot rapidly rise to a level where excessive incongruities in a number of domains associated with unfamiliar high residential density are easily tolerated. If the GIAL has risen enough to at least approach the incongruity that is experienced, then we might expect the person to engage in cloze actions, e.g, the person might explain to himself and others why he continues to put up with the dense conditions ("but I like all the advantages of living in New York").

However, the GIAL may never rise high enough to approach the experienced incongruity: there can be limits to *how far it will shift*. The results would likely be serious or even disasterous. The combine levels of excessive incongruity from the relevant SIALs produced by residential density would combine with additional incongruity due to the persons' attempts to ameliorate the dense conditions and due to failure in these efforts. Control,

in other words, cannot be obtained. The person is likely to stop attempting to utilize ineffective cloze actions (learned helplessness). He would experience considerable negative affect and would likely respond to decrease the excessive incongruity via withdrawal from social contact, via distortion, or via aggression. The more severe the density and other associated effects in residential crowding, the longer the condition is maintained, and the less the person is able to deal with the problem directly, the more extreme one might expect these maladaptive responses to be.

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