Effects of Crowding and Confinement on Inmates

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Abstract

Recent studies have demonstrated that crowding in prisons can have a variety of deleterious effects. One frequently obtained result is higher illness complaint rates in open dormitories relative to single or double cells. In the present study it was found that this illness rate effect consists primarily of noncontagious and high verifiable complaints. Evidence was also obtained for elevated levels of catecholamines in dormitory residents. Catecholamine secretion has been associated with increased stress in other studies.

Detailed analyses were done on the influence of background factors on reaction to dormitory housing. A variety of background and experiential factors were shown to have an impact. Degree of tolerance for crowding was also measured directly using various tests and was found to be a useful predictor of reaction to dormitory housing. A theoretical model was developed to account for the findings of this study.

Executive Summary

One of the major issues in corrections for the past 15 years has been overcrowding in prisons. Prison populations have been increasing rapidly without commensurate increases in prison housing facilities. A number of studies have examined the impact of overall prison crowding as well as crowding in particular housing units. Research using archival records has found that increased prison size and increased population within prisons is related to increased rates of psychiatric commitment, disciplinary infractions, suicides, violent deaths and deaths due to natural causes. Studies of housing within a prison have shown that increasing the number of inmates sharing a particular living area increases negative psychological reactions, illness complaint rates and in some cases blood pressure. Open dormitories housing 30 or more inmates represent a particularly problematic housing arrangement since this type of housing involves confinement with large numbers of others in limited space. Relative to singles and double cells, dorms are associated with elevated illness complaint rates, headaches and slight elevation in blood pressure.

A major concern of the present project was to determine those characteristics of inmates that make them more sensitive to dormitory living. Among the characteristics examined were age, size, intelligence, socioeconomic and educational level, history of crowding while growing up, criminal history and length of confinement. It appears that higher socioeconomic and educational level are related to negative reactions to prison housing in general and dormitories in particular. For individuals of somewhat higher socioeconomic level, prison housing may represent a greater contrast with their prior environment. Alternatively, individuals of lower socioeconomic or educational level may have learned to cope better with the deprivations encountered in prison (e.g., lack of privacy, poor food, poor climate control and potential physical danger).

Three background variables that appeared to be particularly relevant for reactions to crowded housing were housing for number of people in the home while growing up (homesize) and size of hometown as child or adult. These three variables affected reactions to doubles and/or dorms, but not singles. Those who grew up or lived in a town of greater than 30,000 population reacted relatively positively to singles but negatively to dormitories. In contrast, individuals who grew up with 6 or more individuals in the home reacted somewhat more positively to doubles and dormitories than those who grew up in less crowded homes. The results for doubles were partially striking in that large homesize was associated with lower perceived crowding, higher ratings of control and lower illness rate.

The above findings on background indicate that certain experiences help one cope with or tolerate crowded prison housing while other experiences may hinder adjustments to such housing. Being used to some degree of socioeconomic and privacy deprivation (crowded homes) seems to ameliorate reactions to crowded prison housing. However, growing up in large towns or cities may lead to a general aversion to dealing with strangers and hence may make dormitory living relatively more intolerable.

An extensive prison history was associated with negative reactions to doubles and especially dormitories. Thus having spent a lot of time in prison in the past makes one more desirous of private housing than is the case for less experienced inmates. Those inmates with an extensive prison history may have experienced living in singles and are thus very sensitive to the deprivations of dormitory living.

Other findings on individual characteristics were that high aptitude or intelligence was related to negative reactions to prison housing in general, while age was not an important factor in determining reaction to housing.

Length of time in prison or in a particular housing unit was related to a

lowering of illness rate and blood pressure. However, evaluation of prison housing and mood state either do not change over time or become somewhat more negative (in the case of total length of confinement). Thus while there is apparently some degree of adjustment physiologically with increased time in prison, evaluation of prison housing itself does not become more favorable.

The results for background factors suggest that some inmates can tolerate crowded living conditions better than others. Several direct measures of tolerance were obtained by having the inmates indicate tolerance or preference for different types of housing using drawings of various housing configurations. Those inmates who exhibited a high tolerance for living with other people in the same housing unit reacted much more positively to dormitory living than low tolerance inmates. Inmates who preferred low density housing even at the expense of reduced space showed positive reactions to singles. These results suggest that such measures of tolerance may be useful in aiding assignment of inmates different types of housing.

While past research has shown that dormitory inmates exhibit elevated illness complaint rates, the interpretation of these results remains controversial. Complaints could reflect simply irritation with one's environment or a cry for help, or they could reflect real pathology induced by the stress of dormitory living. Detailed analyses of the illness complaint data indicated that the main difference between dorms and singles was in complaints that were pain related or amenable to verification. Complaints of a psychological nature or highly contagious illnesses did not appear to be differentially affected. To bolster this analysis, physicians were asked to rate the various illness complaints as to verifiability, contagiousness and stress-sensitivity. Analyses based on these ratings again revealed that only complaints that were highly verifiable and noncontagious showed elevated rates in dormitories. The above analyses provide strong support for the argument that

the impact of dorms represents a true illness effect and not simply general irritability or complaining.

Direct measurement of physiological indicators of stress in prisons has been confined to blood pressure. While there is some evidence for elevated blood pressure in dormitories, the effect appears to be rather weak. A more useful measure of physiological stress is the secretion of the catecholamines in the urine. This technique has been used successfully in a broad variety of research projects, but has not been feasible in prisons. A study was done at a federal prison in which dormitory residents were compared with residents of single rooms or cubicles for catecholamine excretion (epinephrine and norepinephrine). Catecholamine excretion was found to be elevated in dormitory housing.

This project has thus provided strong support for previous conclusions that dormitory housing in prisons is a source of stress and has negative impact on health. Evidence also indicates that certain experiences make inmates more sensitive to living in dormitories. In general those inmates who are of higher socioeconomic and educational background, have grown up in less crowded homes and large towns and have extensive prison history seem to have most problems with dormitory living. It appears that inmates' tolerance for crowded housing depends on specific experiences that enable them to cope with or tolerate such housing.

The theoretical implications of the results of the project were fully developed and suggest the need to elaborate the conventional model of crowding or environmental stress in order to account for the complexity of the environmental and social stressors experienced in prison.

Overview of Project

The main aim of this project was to complete the analysis of data gathered under an LEAA grant in 1978-1980. This analyses involved assessment of the impact of housing conditions on a number of variables that were not available for analysis earlier as well as a number of questions that were beyond the scope of the initial project.

The specific tasks accomplished during the Visiting Fellowship period were as follows:

1. Extensive Data Management

Separate files existed for each of the institutional visits. In order to allow for cross-institutional analyses a common file had to be developed along with a common program. This required extensive modification of each data set and associated programming.

2. Additional Data

Some data that was obtained during our research visits was not entered into the data file because of time constraints. These data included information about offense, past sentence and confinement history and additional details about housing history.

3. Programming

The utilization of new measures and addition of new data required considerable additional programming.

4. Medical Data Recoding

All of the medical complaints were recoded and entered into a separate data file. Previously the medical complaints were coded only as total number of contagious or noncontagious complaints. The recoding involved assigning codes to each unique type of visit and entering each visit into the data file. This recoding thus provided temporal as well as complaint specific information.

5. Medical Complaint Evaluation

Washington, D.C. area family physicians and medical personnel from the Federal Prison System rated the medical complaint data along various dimensions (e.g., verifiability and stress sensitivity). These data were coded and entered into a computer file. This data provided information that would aid interpretation of the medical complaint results.

6. Urine Chemistry Study

Toward the end of the fellowship period an opportunity arose to do an assessment of urine chemistry measures of stress at Danbury FCI. This study was conducted in conjunction with research associates from the Research Office of the Federal Prison System and from the Uniformed Services University of the Health Sciences.

7. Data Analyses

Utilizing data previously gathered and new data acquired during the fellowship period, a series of analyses were completed. These analyses focused on the impact of different types of prison housing on various psychological and behavioral measures, the influences of background and experiental factors on reaction to prison housing and the role of tolerance for crowding in such reactions.

Introduction

For a number of years, the issue of crowding has been a topic of concern to the laymen and the scientist. Recently, a large number of studies have been carried out to determine the effects of exposure to crowding on both humans and animals (see Paulus, 1980; Stockdale, 1978; Sundstrom, 1978; Baum and Paulus, in press). These studies have been done in laboratory, work, play and living settings. In some cases, direct observations are made, while other studies rely mostly on archival records. Although there is some inconsistency in results, most reviews conclude that substantial evidence exists that crowding can have a variety of deleterious effects on social behavior, task performance and health.

One environment in which high levels of crowding are frequently encountered is prisons and jails. Populations in these institutions have increased considerably in the past 15 years, while facilities have generally lagged behind these population increases (American Prisons and Jails, 1980). The result has been a large number of legal suits challenging the constitutionality of conditions found in prisons (e.g., Rhodes vs. Chapman; Ruiz vs. Estelle).

With my colleagues, Verne Cox and Garvin McCain, I have been involved in an extensive study of the prison crowding problem. Our main focus has been to examine the health-related effects of crowded living conditions. From archival records of various state prison systems, we have determined that degree of crowding in a prison system or a particular prison may be related to increased disciplinary problems, psychiatric commitments, suicides, violent deaths and mortality for older inmates (cf. Cox, Paulus, McCain, in press). Within particular prisons (both state and federal) we have found that more crowded housing (increased number of residents in a living unit and reduced amounts of space) is related to negative psychological reactions and increased illness complaints (cf. McCain, Cox, & Paulus, 1980; Paulus, McCain & Cox, 1981). In particular, open dormitories with 30 or more inmates are reacted to quite

negatively and produce about twice as many illness complaints as single or double cells. Moreover, comparisons of cells housing from 1 to 6 inmates also reveal increasingly negative effects with increased number of residents. Residents in doubles feel more crowded and may have more disciplinary problems and illness complaints than residents in singles. In several studies of multiple occupant cells (3 or more inmates in a cell), we have found that these lead to more negative reactions than housing with only one or two inmates. In a federal prison, increased numbers of inmates in a cell was related to increased illness complaints, while in a state prison it was associated with increased blood pressures.

We have also done several studies in jails. As prisons become more crowded and are forced to reduce populations, the number of inmates held in jails increases correspondingly. In two studies of jails (McCain, Cox, & Paulus, 1976; Paulus & McCain, 1983), we have found that jail crowding has effects similar to that of prison crowding. However, a failure to find illness complaint effects in the second study suggests the need for additional research to compare the extent to which prison and jail crowding has comparable effects. Differences in populations, medical services, length of confinement and other factors may contribute to differential effects.

Other investigations have also found considerable evidence for the negative impact of prison crowding. Degree of overcrowding relative to capacity has been related to elevated reconviction rates (Farrington & Nuttall, 1980) and disciplinary infraction rates (Gaes & McGuire, 1982; Megargee, 1977; Nacci, Teitelbaum, & Prather, 1977; Ruback & Carr, in press). Bruehl, Horvat and George (1979) found that during periods of crowding, the relatively superior performance of a treatment unit (in program, educational and disciplinary categories) was eliminated. A number of studies have documented the negative effects of crowded housing types. D'Atri and his colleagues (D'Atri, 1975;

D'Atri, Fitzgerald, Kasl, & Ostfeld, 1981; D'Atri & Ostfeld, 1975) have found that inmates living in open dormitories may have slightly higher blood pressures than these same or other inmates living in single cells. Ray, Wandersman, Ellison, and Huntington (1982) found that both social and spatial density were related to negative reactions to dormitories.

A considerable number of studies thus far have found evidence for the negative impact of crowding in prisons. These studies have also determined that number of people in a housing unit is a more important factor than amount of space, and that mere provision of privacy cubicles in an open dormitory reduces the negative effects of dormitory living (Cox et al., in press). Yet many questions remain to be resolved. I will discuss some of these questions below in the context of measures we have employed in our research.

Individual Differences Factors

Only a few studies have considered the influence of background or individual differences factors on crowding related responses. The background factor that would seem to be most pertinent to an analysis of crowding is the degree to which the individual experienced crowding in the past. Having lived in a crowded city, growing up in a crowded home, or having spent extensive periods of time in crowded prisons may lead to a greater tolerance of crowded living conditions. Some studies have in fact found some support for this reasoning (e.g., Eoyang, 1974; Wohlwill & Kohn, 1973), while other studies suggest that past experience with crowding leads to increased sensitivity to crowded conditions (e.g., Baum & Valins, 1977; Paulus, Cox, McCain & Chandler, 1975). Individual difference factors such as age, size and intelligence may also influence reactivity to crowding. Older inmates may act somewhat more negatively to crowded conditions because of a lowered tolerance for stimulation (Sales, Guydosh, & Iacano, 1974). Higher intelligence may be related to a greater desire for solitary intellectual activities (e.g., reading) which may be

influence reactivity to crowding. Older inmates may act somewhat more negatively to crowded conditions because of a lowered tolerance for stimulation (Sales, Guydosh, & Iacano, 1974). Higher intelligence may be related to a greater desire for solitary intellectual activities (e.g., reading) which may be frustrated by crowded conditions. Larger indidivduals may have less to fear from potential violence by other inmates and hence may show less stress reactions in crowded conditions.

Another way of approaching the individual difference factor is to isolate those individuals who express the most distress in response to living in crowded conditions, in terms of housing evaluation, mood state and feelings of control. The extent to which these measures predict illness complaints, social behavior, disciplinary infractions and blood pressure independent of housing conditions can then be assessed. A number of theoretical perspectives suggest that feelings of crowding, depressed mood state, and lowered feelings of control should be related to elevated illness complaint rate and blood pressure and reduced levels of social behavior (Baum & Valins, 1977; Cohen, Glass, & Phillips, 1979; Cohen, Evans, Krantz, & Stokols, 1980).

Crowding Tolerance

In our research we have employed various techniques to assess tolerance for crowded living conditions. These techniques involve assessing the individual's subjective reaction to various housing arrangements. In our early studies we employed a figure placement task in which inmates were asked to place figures in a model of an open dormitory (e.g., Desor, 1972). They were asked to put in as many figures as they could without making it "too crowded." We found that inmates living in crowded dormitories showed less tolerance on this task than those living in less crowded housing. Furthermore, the longer they lived in the dormitories, the lower the tolerance. These results suggest that the experience

housed in them. There were 8 schematics in which the number of bunks increased in order from 8 to 22 (Appendix A). The drawings were shown to the inmates one at a time, and the inmate was asked to indicate when the investigator should stop in the series, because any more bunks in the dormitories would make it "too crowded." The number of bunks on the last drawing shown was presumed to reflect the individual's tolerance for dormitory living. The dormitory was drawn to the scale of one of the large open dormitories in one of the federal prisons which housed anywhere from 26 to 40 inmates. This same series of drawings was also used to assess the inmates' feelings about the "ideal" number of inmates in dormitories. Inmates were shown the same series of drawings with the instruction to tell the investigator to stop when the ideal number of inmates in the dormitory was shown. One half of the inmates were asked to do the tolerance test first, while the other half did the ideal test first. One might expect the results of these two tests to be quite similar, especially since they were done sequentially. Yet it is conceivable that some individuals may have learned to tolerate high levels of crowding because of past experiences with such conditions, yet those same individuals may also have a strong preference for uncrowded conditions because of their past deprivation. In any case, these tolerance and ideal measures provide another means of assessing the relationship of subjective standards about crowding to reactions to living in actual crowded conditions. For example, low tolerance on this task should be related to increased negative reactions in dormitories but not in singles (and possibly doubles).

We also employed a relatively elaborate housing preference test to determine more precisely inmate reactions to different types of housing arrangements. This preference test consisted of 23 pairs of drawings that represented two different types of prison housing (Appendix B). These pairs varied in the number of people depicted as living in the units and the amount of space

allotted. This was designed to assess differential sensitivity to amount of space and number of cell or dorm-mates. The relation of these preferences to inmate characteristics and to inmate reaction to actual prison housing can be examined. One might expect that those who show a definite aversion for high numbers of people in a housing unit would give the most negative behavioral and psychological reactions to living in a crowded dormitory. Conversely, individuals who show a strong sensitivity to amount of space would be expected to react negatively to housing units that have little space, even if they contain only a small number of residents (e.g., 2). Potentially a subset of items from the housing preference test could be used as part of a diagnostic battery given to inmates when they first enter the institution.

Illness Complaint Rate

One of the most important measures of the impact of prison housing has been the rate of illness complaints. We have interpreted those results as reflecting, in part, the stress generated by crowded housing. Yet illness complaints could reflect a variety of factors other than actual physical pathology (Mechanic, 1980). For example, elevated rate of illness complaints may indicate increased sensitivity to bodily processes, irritability, or a general cry for help. The resolution of this ambiguity can be aided by a detailed analysis of the types of complaints reported. Previous analyses were limited to comparison of contagious and noncontagious complaints. It would be of interest to determine which types of complaints are increased in crowded prison housing. If there is no particular pattern, a purely psychological interpretation for illness complaints remains tenable. However, if a certain set of illness complaints typify inmates in crowded housing, such an interpretation may be less viable. Those complaints that are easily verifiable by physicians are of particular interest since these would provide strong evidence for the existence of physical patholgy.

Effects of Length of Prison Confinement

The effects of prison confinement have been investigated in numerous studies, but many questions remain about the effects of crowding, length of confinement and individual differences in the impact of confinement (Bukstel & Kilman, 1980). Some theorists suggest that as length of confinement increases, the psychological and physical state of the individual should deterioriate, while others suggest that inmates may adjust or adapt quickly to their confinement (cf. Bukstel & Kilman, 1980). A careful analysis of the effects of length of confinement for each housing condition would provide much information relevant to the prison confinement issue. Of particular interest will be the effects of confinement on mood state, feelings of control, social behavior and illness complaint rate.

Theories of Crowding

The effects of crowding have been interpreted in terms of a variety of theoretical schemes. Some have argued that crowding involves stimulation or stimulus overload (e.g., Cohen, 1978; Saegert, 1978). Living or having to interact with many others in dense conditions may tax one's attentional and cognitive capacities. The degree to which these situations involve uncertainty, unfamiliarity, novelty and unpredictability determines the extent of experienced overload. The experience of overload is predicted to result in cognitive fatigue and social withdrawal.

Another perspective of crowding is that it is a source of arousal because of the uncertainty or fear producing qualities of the individuals to which one is exposed (Evans, 1978; Paulus, 1980). Some arousal theories emphasize that negative effects of crowding will not ensue unless the individual recognizes or labels the experienced arousal state as crowding-related. The arousal state should be reflected in various psychological measures and debilitation of complex task performance.

A third approach focuses on the interference experienced in crowded settings. It is argued that crowded settings interfere with one's ability to attain a variety of desired goals (e.g., Stokols, 1976; Altman, 1975; Schopler & Stockdale, 1977). These goals may be density related, such as having privacy or sufficient space, or related to other recreational, work and instrumental (e.g., eating, showering) activities. The role of goal interference is predicted to be most important in one's primary living environment (Stokols, 1976). Because of the focus on interference and goal blocking, this approach is called behavioral constraint. It is predicted that constraint or interference in crowded settings will lead to various attempts to reduce the interference. Individuals may attempt to structure or regulate their activities to avoid interference as much as possible. Alternatively, aggressive behavior may result either out of frustration or as an attempt to assert one's control over the situation.

The concept of control is the major focus of a currently popular perspective of crowding (e.g., Baron & Rodin, 1978; Schmidt & Keating, 1980). The unpredictability and uncontrollability of interaction in dense environments are seen as a threat to the individual's feelings of control. Feelings of lack of control are predicted to lead to feelings of helplessness and subsequent passivity (Seligman, 1975). Most importantly, many studies have shown that feelings of control determine the extent to which environmental stressors such as crowding have debilitating effects (e.g., Cohen et al., 1979). The above theoretical perspectives are summarized in Table 1.

We have recently proposed that most of the hypothesized theoretical mechanisms can be subsumed under the concepts of uncertainty, interference and cognitive load (Cox et al., in press). Crowded environments are predicted to produce negative consequences to the extent that these environments increase uncertainty about interactons with others and social consequences, interfere with goals (e.g., privacy and recreational activities), and increase the mental

Table 1

Comparison of Models of Crowding

MODEL	ENVIRONMENTAL FOCUS	MEDIATING VARIABLES	RESPONSE FOCUS
Overload	Number of People Number of Interactions Spatial Constriction Environmental Demands	Intensity of Stimuli Uncertainty of Stimuli Unpredictability Unfamiliarity Complexity Novelty Unwanted Stimulation	Attentional Capacity Cognitive Fatigue Withdrawal
Arousal	Number of People Space Interpersonal Distance	Attributions Uncertainty Fear Stimuli	Arousal State Quality of Task Performance Crowding Label
Behavioral Constraint	Spatial Constraint Number	Restriction of Freedom Lack of Control Inability to Regulate Interaction or Stimulation Coordination of Problems Interference Limited Resources Goal Blocking Primary Versus Secondary Environment	Psychological and Behavioral Adjustments Feelings of Crowding
Personal Control	Number Space Privacy	Degree of Perceived Control Uncontrollability	Mood Stress Task Performance Social Behavior Helplessness/Passivity

demands required to function effectively. High levels of uncertainty, goal interference and cognitive load are presumed to lead to the specific consequences of fear (stress), frustration and cognitive strain respectively (Figure 1).

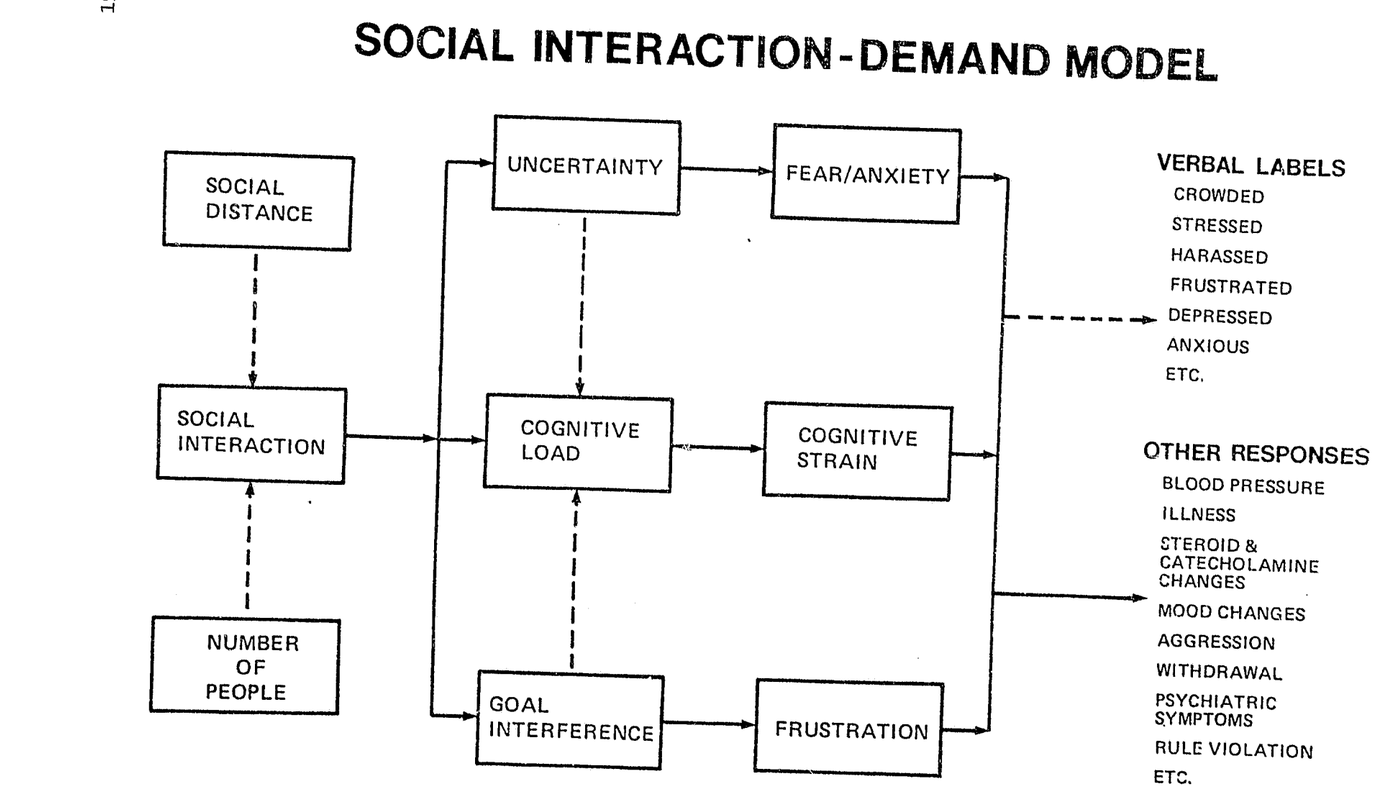
Our research was not designed to explicitly test the veracity of various theoretical explanations. However, the outcomes of the various data analyses may be pertinent to an evaluation of these different approaches.

Research Procedures

The data which will be discussed was gathered during a two-year period, from 1240 inmates in six federal prisons (cf., McCain et al., 1980). In each prison we randomly selected a sample from various housing units which varied in degree of crowding (e.g., singles, doubles and open dorms). These inmates were asked to report to a testing station in groups of six every 15 minutes. When they arrived, the study was explained and informed consent forms were given to the volunteers. Typically, 90% or more of the inmates agreed to participate. In most cases, no incentives were offered, although on some occasions we offered a soft drink for participation.

At the research station, inmates first had their blood pressure taken, using an automated electrosphygmomanometer, and were asked to rate how crowded they felt in their current housing on a four point scale. Next, inmate crowding tolerance was assessed using the housing preference, tolerance and ideal tests. Finally, inmates were asked to complete a detailed questionnaire about their perceptions of their prison housing, their mood state and background (see McCain et al., 1980 for details). Background information consisted of items about criminal history, education and family. From prison records we obtained information about housing and criminal and prison history. Data about illness complaints were obtained from medical clinic records. The date and type of complaint were noted for each inmate during the period in which they were

Figure 1. Social interaction-demand model.



residents in their latest housing units. Such data was gathered for up to a six-month period.

Data Analysis Procedures

With the multitude of variables employed in this research, discovering simple relationships unique to one variable becomes rather difficult. A number of the variables are likely to be correlated with one another and one may need to control for these statistically to aid interpretation. However, some variables may be so highly correlated that it becomes difficult to use such procedures effectively (the problem of multicollinearity). Furthermore, when one uses multivariate regression techniques to assess the relative importance of variables, the influence of less powerful variables is often masked because of the common variance shared with more powerful variables. Also, with the use of multivariate analyses the available sample size is often considerably reduced because of deletion of subjects for whom one or more of the variables is missing. This makes analysis of the variables introduced in the later phases of the project and separate analyses within type of housing problematic because of limited sample size.

Thus, even though multivariate analyses are a useful way of analyzing the relative importance of variables in influencing reactions to prison housing, there remains some utility in assessing the univariate relationships. Assessment of the predictive power of individual variables without regard to others may reveal relationships that might otherwise not be apparent. Furthermore, the "real world" predictive utility of variables is only apparent from such analyses. This is an important consideration because of the potential for application of the results of this research. In the univariate analyses, subjects were generally dichotomized around the median within singles, doubles, and dormitories.

The approach taken in this paper thus consisted of a mixture of multivariate

and univariate analyses. Multivariate analyses were done to obtain a broad perspective about relationships. Subsequent univariate analyses were done to discover relationships which may have been masked by the multivariate analyses. In some cases this procedure was reversed in order to aid interpretation of univariate data.

Factor analyses of the various questonnaire scales indicated that subsets of scales (room, choice and control) reflected somewhat unique factors. Consequently, the items for each subset were simply summed to produce overall scores. Only in the case of the mood items was there evidence of multiple factors - six items loaded on one factor while two (stimulated/tense) loaded on another. Thus two separate mood scores were calculated. The various background and historical variables were also subjected to factor analysis to determine the extent to which they tap a similar dimension (Table 2). It can be seen that the variables do seem to reflect somewhat different factors, although some of the factors are rather weak. This factor structure will be used as a guide in organizing the data analyses.

The major predictor variables and criterion variables are listed in Tables 3 and 4 along with their associated scale of measurement. The reader may wish to make an extra copy of these tables to facilitate evaluation of results in various tables.

Results

In analyzing the influence of predictor variables, various sets of analyses were done. First, the contribution of subsets of related variables was examined. Then the contribution of all these variables simultaneously was assessed. This was followed by specific univariate analyses for specific housing types.

Background Factors

As argued earlier, the past history of the inmate may influence his reaction

Table 2

Factor Analysis of Predictor Variables

		Factors and Factor Scores	
Factors	Variables	Factor Scores	Eigenvalue
1	Weeks in Prison	.84	1.36
	Weeks Committed	.70	
2	Parent Occupation	.64	1.31
	Parent High School	.60	
	Homesize	-.30	
	Grade in School	.47	
3	Hometown/Adult	.64	.92
	Hometown/Child	.76	
4	Prior Commitments	.61	.88
	Duration of Priors	.74	
5	Custody	.67	.61
	Months Left to Serve	.46	

Table 3

List of Predictor Variables

Parental Occupation (1 = nonskilled, 2 = skilled, 3 = professional)

Parent High School (1 = graduate, 2 = no)

Homesize (high = more people in home)

Grade in School Completed

SAT Score

Beta IQ Score

Hometown as Child (1 = small, 2 = large)

Hometown as Adult (1 = small, 2 = large)

Prior Commitments (0-3)

Duration of Prior Commitments (weeks)

Custody (1 = closed, 2 = medium, 3 = minimum, 4 = community)

Months Left to Serve

Weeks in Housing

Weeks in Prison

Weeks in Present Sentence

Height

Weight

Age

Table 4

List of Criterion Variables

Psychological/Physiological

Total Illness Rate

Illness Rate for period greater than 6 weeks

Perceived Crowding (1 = low, 4 = high)

Room Rating (6 scales, high = positive)

Systolic Blood Pressure

Diastolic Blood Pressure

Mood (6 scales, high = positive)

Tense/Stimulated (2 scales, high = positive)

Crowding Complaints (high = more)

Other Complaints (high = more)

Choice (3 scales, high = positive)

Control (4 scales, high = positive)

Sleep Problems (0 = no, 1 = yes)

Headache Problems (0 = no, 1 = yes)

Tolerance (high = more tolerant)

Behavioral

Talking (1 = very little, 4 = great deal)

Sports Activities (high = more)

Religious Activities (high = more)

Club Activities (high = more)

Educational Activities (high = more)

to his present housing. Four of the predictor variables (parental occupation, parent finishing high school, homesize and grade in school) seem to represent a socioeconomic factor to some extent (see Table 2). One might expect low socioeconomic status to be related to a more positive response to prison housing because of past deprivations. Alternatively, higher socioeconomic level might be related to better coping ability and hence better adjustment. Size of hometown as child or adult may also be relevant since growing up in crowded urban areas could influence tolerance for crowded prison living. The results for the multiple repression analyses for these variables (variables entered simultaneously) are shown in Tables 5-7. In Table 5, it can be seen that these background variables generally account for a small amount of variance. There do appear to be some consistencies in the results, however. Higher educational achievement or higher occupational and educational level of parents were related to generally negative reactions to the prison environment (perceived crowding, room rating, mood state, complaints, choice and tolerance). Larger homesize (number of residents in the home while growing up) was related to lower blood pressure and fewer crowding complaints especially in dormitories. Size of hometown did not appear to be related in a singular way to reaction to housing. Residing in a large hometown, either as a child or an adult, was related to lower blood pressure and more positive mood state but more housing complaints in the overall analyses. In addition, in singles, large hometown was related to high tolerance but in dorms it was associated with lower feelings of choice. Thus on some dimensions, residing or having grown up in larger hometowns leads to more positive reactions, but on others it leads to more negative reactions.

Results for the univariate analyses are shown in Tables 8-13 and are generally consistent with those of the multivariate analyses. If their parents had completed high school, inmates were likely to rate doubles and dorms as relatively more crowded. In dormitories, they also had lower tolerance and

Table 5

Contribution of Background Variables in Multiple Regression Analyses

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	None			.01	729
Perceived Crowding	Parental Occupation	.11	.02	.02	729
Room Rating	None			.01	729
Systolic Blood Pressure	None			.01	729
Diastolic Blood Pressure	Homesize	-.08	.05		729
	Hometown as Child	-.08	.05	.01	729
Illness (>6 weeks)	None			.01	472
Mood	None			.03	243
Tense/ Stimulated	Hometown as Adult	.17	.03	.05	243
Crowding Complaints	Homesize	-.13	.055		243
	Grade in School	.26	.001	.12	243
Other Complaints	Hometown as Child	.15	.05	.03	243
Choice	Grade in School	-.24	.001	.10	243
Control	None			.02	243
Sleep	None				569
Tolerance	None			.04	158
Headaches	None			.02	405

Table 6

Influence of Background Variables in Multiple Regression Analyses for Singles

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	None			.05	172
Perceived Crowding	Parental Occupation	.17	.05	.06	172
Room Rating	None			.06	172
Systolic Blood Pressure	None			.02	172
Diastolic Blood Pressure	Hometown as Adult	-.21	.01		172
	Parent Finishing High School	-.19	.03	.10	172
Illness (>6 weeks)	None			.06	111
Mood	None			.07	74
Tense/ Stimulated	None			.05	74
Crowding Complaints				.06	74
Other Complaints	Parent Finishing High School	.33	.02	.12	74
Choice	Grade in School	-.27	.05	.10	74
Control	None			.12	74
Sleep	None				273
Tolerance	Hometown as Child	.57	.02	.28	31
Headache	None			.09	97

Table 7

Influence of Background Variables in Multiple Regression Analyses for Dorms

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	None			.06	145
Perceived Crowding	Grade in School	.28	.01	.10	145
Room Rating	Grade in School	-.29	.001	.11	145
Systolic Blood Pressure	Hometown as Adult	-.21	.03	.07	159
Diastolic Blood Pressure	Homesize	-.15	.06	.05	159
Illness (>6 weeks)	None			.03	104
Mood	Parent Occupation	-.31	.02	.12	80
Tense/ Stimulated	Hometown as Adult	.32	.01		
	Parent Occupation	-.28	.02	.26	80
Crowding Complaints	Homesize	-.39	.01		67
	Parent/High School	-.27	.04	.26	67
Other Complaints	Homesize	.28	.05	.12	67
Choice	Grade in School	-.44	.001		81
	Hometown as Child	-.23	.05	.30	81
Control	None			.06	81
Sleep	None			.02	160
Tolerance	Parental Occupation	-.32	.05	.29	50
Headache	None			.07	45

ideal scores and reported feeling more tense/stimulated (Table 8). Higher parental occupation level was associated with greater feelings of crowding in singles and negative room rating and mood state in dormitories (Table 9).

Generally, those who completed more grades (12 or more) evaluated dormitories more negatively and expressed lower feelings of control and lower degrees of tolerance. In singles, completion of more grades was also associated with negative feelings (mood, control and complaints). However, these same individuals had lower illness rates (Table 10). The results for last grade completed are similar to those for parental achievement in that this variable influences reactions to both singles and dorms.

For homesize, the inmates were dichotomized on the basis of the number of people who were in their home while they were growing up (5 or less vs. 6 or more). This factor did not influence reaction to singles but did affect reaction to doubles and dormitories. In doubles, residents who grew up with more people in the home felt less crowded, perceived more control over their environment and had lower illness complaint rates than the other inmates. Dormitory residents who grew up in more crowded homes had a lower number of crowding complaints, lower illness complaint rates, and lower involvement in club activities than other inmates (Table 11). These results suggest that living in a home with a relatively large number of people leads to an increased tolerance of living in crowded prison housing. Of course, it should be remembered that increased homesize is related to socioeconomic status and educational achievement. Yet the homesize variable does seem to tap some distinctive crowding related characteristics since effects for this variable were obtained only for the doubles and dorms and not for singles. Furthermore, only the homesize was related to illness in doubles and dorms.

The analyses for size of hometown revealed an interesting contrast between reactions to singles and dorms. For both the child and adult measures,

Table 8

Results for Parents Finishing High School

Variables	Singles No, Yes	Doubles No, Yes	Dorms No, Yes
Diastolic Blood Pressure	63.40, 59.95 F(1,232)=5.19(.05)		
Perceived Crowding		2.93, 3.45 F(1,139)=6.35(.02)	2.98, 3.23 F(1,139)=6.35(.02)
Club Activities			.30, .70 F(1,239)=6.65(.02)
Tolerance Score			13.11, 11.27 F(1,75)=5.09(.05)
Ideal Score			16.00, 10.45 F(1,75)=4.12(.05)
Tense/ Stimulated			8.19, 7.00 F(1,130)=4.43(.05)
Perceived Control	8.74, 7.30 F(1,103)=4.17(.05)		
Total Illness Rate	.26, .16 F(1,227)=4.38(.05)		

Table 9

Results for Parent's Occupation

Variables	Singles 1,≥2	Doubles 1,≥2	Dorms 1,≥2
Diastolic Blood Pressure	63.55, 60.23 F(1,225)=4.67(.05)		
Perceived Crowding	1.69, 1.96 F(1,228)=4.68(.05)		
Sports Activities	2.49, 3.40 F(1,231)=6.48(.02)		
Club Activities	.42, .72 F(1,231)=4.22(.05)		.28, .75 F(1,220)=7.82(.01)
Talking	2.41, 2.72 F(1,231)=6.34(.02)		
Mood State			22.05, 18.21 F(1,128)=7.54(.01)
Room Rating			15.46, 12.84 F(1,199)=4.99(.05)

Note: Occupation Code; 1 (nonskilled), 2 (skilled), 3 (professional)

Table 10

Results for Last Grade in School

Variables	Singles <11,>12	Doubles <11,>12	Dorms <11,>12
Perceived Crowding			3.03, 3.48 F(1,199)=12.13(.001)
Club Activities		.26, .67 F(1,131)=6.71(.02)	
Tolerance Score			12.61, 9.95 F(1,57)=6.64(.02)
Crowding Complaints			.40, .87 F(1,201)=13.82(.001)
Mood State	27.00, 23.16 F(1,93)=4.63(.05)		
Perceived Control	9.06, 7.47 F(1,94)=4.52(.04)		4.76, 3.60 F(1,108)=13.15(.001)
Room Rating			14.59, 11.88 F(1,182)=5.88(.02)
Illness Rate (>6 weeks)	.30, .16 F(1,132)=4.86(.05)		
Total Illness Rate	.26, .14 F(1,207)=7.83(.01)		

Table 11

Results for Homesize (Number of people in home)

Variables	Singles <5,>6	Doubles <5,>6	Dorms <5,>6
Perceived Crowding		3.46, 2.90 F(1,148)=12.26(.001)	
Club Activities			.68, .28 F(1,250)=7.80(.01)
Crowding Complaints			.74, .48 F(1,251)=4.80(.05)
Perceived Control		4.82, 7.38 F(1,33)=5.78(.05)	
Illness Rate (>6 weeks)		.21, .11 F(1,79)=5.60(.05)	.27, .17 F(1,142)=4.00(.05)
Total Illness Rate		.26, .15 F(1,140)=4.29(.05)	

residents of large hometowns reacted relatively more positive to singles but relatively more negative to dormitories (Tables 12 & 13). For example, residents of singles who had grown up in a large city as a child rated these rooms more positively, showed greater tolerance for crowding and had less problems with sleeping than residents who had grown up in small towns. In contrast, urban dormitory residents had higher feelings of crowding, rated their rooms more negatively and had lower ratings of degree of freedom of choice. Reaction to doubles appears not to be strongly affected by urban/rural experience.

The results of the univariate analyses are thus generally consistent with those of the multivariate ones - higher socioeconomic and educatonal level is related to negative reactions to prison housing. Yet for variables that seem most pertinent for reactions to crowded housing - homesize and size of hometown - the univariate analyses were somewhat more revealing in showing differential reactions to singles versus doubles and/or dorms.

Additional Individual Variables

Several individual or background variables not discussed earlier were also examined by univariate analyses. Intelligence or achievement scores were available for a subset of inmates. Individuals with high SAT scores had a relatively lower illness rate in singles and dorms. While SAT scores are not related to other differential reactions to singles, high SAT scorers do evidence some negative reactions to doubles and dorms. In doubles, high scorers evaluate their rooms more negatively and have lower tolerance scores, while in dorms they have more crowding complaints and lowered perceived choice than lower scorers (Table 14). In contrast, high scores on the Beta IQ test were related to negative reactions to both singles and doubles (Table 15). Thus the most appropriate conclusion may be that superior intellect is related to negative reactions to prison housing in general. However, since illness rate is generally

Table 12

Results for Size of Hometown as a Child

Variables	Singles Small, Large	Doubles Small, Large	Dorms Small, Large
Perceived Crowding			2.9, 3.3 $F(1,242)=10.37(.01)$
Sleep Problems	.59, .46 $F(1,246)=4.40(.05)$		
Sports Activities		2.58, 3.62 $F(1,147)=4.94(.05)$	
Tolerance Score	9.74, 12.12 $F(1,38)=5.74(.05)$		
Perceived Choice			4.53, 3.81 $F(1,137)=5.57(.02)$
Room Rating	21.63, 25.54 $F(1,242)=9.49(.01)$		15.08, 12.40 $F(1,222)=6.23(.02)$

Table 13

Results for Size of Hometown as Adult

Variables	Singles Small, Large	Doubles Small, Large	Dorms Small, Large
Religious Activities		1.30, .70 F(1,145)=5.25(.05)	
Noncrowding Complaints	.11, .24 F(1,250)=4.12(.05)		
Mood		13.5, 20.6 F(1,31)=5.91(.05)	
Room Rating	20.76, 25.25 F(1,244)=11.16(.001)		16.13, 12.94 F(1,224)=6.44(.02)

Table 14

Results for SAT Scores

Variables	Singles ≤76, ≥77	Doubles ≤74, ≥75	Dorms ≤73, ≥74
Club Activities		.25, .65 F(1,101)=4.96(.05)	
Talk			2.21, 2.76 F(1,131)=9.86(.01)
Crowding Complaints			.25, .91 F(1,137)=19.17(.001)
Perceived Choice			4.64, 3.48 F(1,63)=9.69(.01)
Room Rating		13.64, 10.59 F(1,100)=5.08(.05)	
Illness Rate	.30, .15 F(1,92)=3.74(.06)		.38, .20 F(1,85)=7.86(.01)

Table 15

Results for Beta Scores

Variables	Singles <109,>110	Doubles <106,>107	Dorms <106,>107
Diastolic Blood Pressure		57.05, 61.40 F(1,112)=3.62(.06)	
Other Activities	.65, 2.00 F(1,58)=5.06(.03)		
Ideal Score		4.15, 1.46 F(1,24)=5.16(.05)	
Noncrowding Complaints	.06, .24 F(1,164)=7.32(.01)		
Mood State		24.57, 15.31 F(1,25)=12.75(.01)	
Perceived Control		8.29, 4.62 F(1,25)=8.05(.01)	
Perceived Choice	4.54, 3.63 F(1,56)=4.65(.04)		
Total Illness Rate	.26, .15 F(1,160)=4.80(.05)		

lower for high scorers (in singles and dorms), these negative evaluations do not seem to eventuate in a strong stress experience.

One factor that may be important in reactions to crowding is age. One might expect older inmates to be somewhat more solicitous of the privacy. Our interviews often elicit complaints from older inmates about the noise made by the younger ones. Yet age of the inmates does not appear to be a strong predictor of differential reaction to housing. The older inmates do rate singles more highly and have more crowding complaints and slightly higher illness rates in doubles than younger inmates (Table 16). The blood pressure and sports results simply reflect obvious age related characteristics and appear to be unrelated to housing type.

Inmates who were above average in both height and weight were compared with other inmates. The working hypotheses was that bigger inmates might have less to fear from other inmates and hence be more comfortable in crowded housing. Using the singles as a baseline, only in the dormitory does this factor lead to differential reactions. Contrary to expectations, bigger inmates rate dormitories more negatively than smaller inmates and express relatively less choice over prison life (Table 17). Possibly, the greater spatial requirements of larger inmates leads to greater sensitivity to dormitory living.

Summary

Taking the results at face value, one could conclude that the most negative reactions to crowded housing (especially dormitories) will come from inmates who grew up with small families, in urban areas, are below average in intelligence, larger, of high socioeconomic level and are likely to have graduated from high school. To some extent these findings mesh with those of other studies. Carr (1980) also found that inmates from urban areas reacted more violently to crowded prison conditions than those from rural areas. Several studies have found that growing up in crowded homes leads to greater tolerance for presently

Table 16

Results for Age

Variables	Singles <33, >34	Doubles <31, >32	Dorms <31, >32
Systolic Blood Pressure	115.75, 120.15 F(1,240)=6.93(.01)	115.70, 119.86 F(1,136)=3.96(.05)	116.93, 120.89 F(1,226)=4.16(.05)
Diastolic Blood Pressure	57.50, 66.95 F(1,240)=43.33(.001)	54.33, 65.30 F(1,137)=32.83(.001)	58.50, 67.16 F(1,226)=39.66(.001)
Other Activities			1.91, .91 F(1,146)=5.85(.02)
Sports Activities	3.45, 2.36 F(1,246)=9.79(.01)	3.98, 2.48 F(1,138)=10.11(.002)	3.22, 2.28 F(1,228)=7.48(.01)
Religious Activities		.55, 1.09 F(1,138)=5.21(.05)	
Crowding Complaints		.15, .42 F(1,138)=6.06(.02)	
Room Rating	22.34, 25.62 F(1, 240)=6.64(.02)		
Illness Rate (>6 weeks)		.11, .20 F(1,73)=3.62(.07)	

Table 17

Results for Height and Weight

Variables	Singles Ht.>70, others Wt.>167	Doubles Ht.>70, others Wt.>167	Dorms Ht.>70, others Wt.>167
Systolic Blood Pressure	119.88, 116.42 F(1,247)=4.61(.05)		122.02, 117.07 F(1,248)=7.05(.01)
Diastolic Blood Pressure	64.41, 60.7 F(1,247)=6.06(.02)		
Perceived Crowding			3.35, 3.01 F(1,250)=6.99(.01)
Headache	.52, .30 F(1,137)=7.04(.01)		
Crowding Complaints	.40, .25 F(1,253)=3.92(.02)		
Total Illness Rate	.15, .26 F(1,241)=6.03(.02)		
Sports Activities			3.42, 2.38 F(1,249)=9.02(.01)
Club Activities		.71, .38 F(1,141)=3.99(.05)	
Perceived Choice			3.60,4.46 F(1,145)=7.64(.01)

experienced crowding (e.g., Eoyang, 1974). The homesize and urban/rural findings appear to differentiate best between reactions to crowded and uncrowded housing. These findings suggest that prior crowding experience is important in determining reactions to prison housing, but one needs to differentiate between crowding experienced in one's primary living environment and the crowding experienced outside the home. Crowding experienced in the home may lead to learning of skills of dealing with others under such conditions and a general acceptance of such conditions as appropriate or tolerable. However, urban or external crowding may lead to social avoidance or withdrawal strategies (e.g., Milgram, 1970; Baum & Valins, 1979). This style of coping does not prepare one very well for the inevitable and uncontrollable interactions of double cell or dormitory living. In a similar vein, Matthews (1980) found that students who were induced to use an avoidance strategy in a crowded laboratory settings reacted most negatively to a later exposure to another crowded setting.

One problem with the interpretation of the homesize results is that these are correlated to some extent with socioeconomic and educational level. However, it should be noted that the effects of homesize and hometown were more pronounced and more clearly crowding related than those of the other variables.

Criminal History

The impact of criminal history was assessed by entering the previously discussed background factors first and then entering the criminal history variables simultaneously. These variables were custody level, prior commitments to prison and duration of prior commitments. Custody level reflects both an institution and a within institution factor. Higher levels of custody would involve more freedom, fewer restrictions and being housed with similar custody inmates. One would expect higher custody to be related to more favorable reactions. Indeed, the overall analysis supports this view, with high levels of custody (less secure) related to lower feelings of crowding, more positive room

ratings, more positive mood state and less headaches (Table 18). However, blood pressures are also higher with higher levels of custody. These relationships are more evident in singles (Table 19) than in dorms (Table 20), probably because of the restricted range of custody in dorms. Dorms would tend to have a predominance of low custody inmates. The overall analyses also revealed that increased criminal history (more prior incarcerations and/or longer total prior incarceration) was related to less tolerance for crowding, more reports of headaches and lower feelings of choice. The addition of the criminal history variables led to a reasonable increase in variance accounted for by all of the variables in most cases.

The univariate analyses of these variables reveal a similar pattern of results. A larger number of prior commitments was related to more negative room rating and lower ideal scores for dorm residents and lowered perceived control for doubles residents. As might be expected, larger number of prior commitments are also associated with less involvement in educational activities (Table 21). Total duration of past confinements, supposedly a more precise measure of the previous confinement experience, yielded much stronger results. Educational activities were again lower for inmates with greater confinement history. For singles, increased length of confinement was also associated with a more positive mood state. In doubles, long confinement history was associated with lower tolerance and ideal scores and higher illness rates. In dorms, increased length of past confinement was related to higher feelings of crowding, lower housing evaluation, lower feelings of choice and more complaints about crowding and other factors. Tolerance for crowding on various measures was also lower for those inmates who had long periods of confinement than for those who had short periods of confinement (Table 22). The results of the duration measure are consistent with those of the number of previous confinements measure and the multivariate analyses in indicating that extensive past prison experience makes

Table 18

Contribution of Criminal History Variables in Multiple Regression Analyses

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	None			.02	665
Perceived Crowding	Custody	-.30	.001	.12	665
Room Rating	Custody	.38	.001	.15	665
Systolic Blood Pressure	Custody	.17	.001	.04	665
Diastolic Blood Pressure	Custody	.26	.001	.09	665
Illness (>6 weeks)	None			.01	428
Mood	None			.04	194
Tense/ Stimulated	Custody	.17	.02	.06	194
Crowding Complaints	None			.15	105
Other Complaints	None			.13	105
Choice	Duration of Prior Commitments	-.18	.02	.09	194
Control	None			.03	194
Sleep	Custody	-.10	.05	.01	397
Tolerance	Priors	-.21	.05		
	Duration of Priors	-.26	.01	.09	121
Headache	Priors	.17	.01		
	Duration	.18	.001		
	Custody	-.33	.001	.13	367

Table 19

Contribution of Criminal History Variables in Multiple Regression Analyses for Singles

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	Custody	-.18	.03	.09	157
Perceived Crowding	Custody	-.18	.04	.09	157
Room Rating	Custody	.25	.01	.14	157
Systolic Blood Pressure	Custody	.16	.06	.06	157
Diastolic Blood Pressure	Custody	.23	.01	.20	157
Illness (>6 weeks)	None			.09	102
Mood	None			.16	61
Tense/ Stimulated	None			.10	61
Crowding Complaints	None			.09	41
Other Complaints	None			.22	41
Choice	None			.16	61
Control	None			.16	61
Sleep	None			.02	164
Headache	None			.11	85

Table 20

Contribution of Criminal History Variables in Multiple Regression Analyses for Dorms

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	None			.10	110
Perceived Crowding	Custody	-.21	.05	.17	110
Room Rating	None			.15	110
Systolic Blood Pressure	None			.09	110
Diastolic Blood Pressure	Priors	.29	.07	.18	110
Illness (>6 weeks)	None			.04	110
Mood	None			.20	58
Tense/ Stimulated	None			.26	58
Crowding Complaints				.33	47
Other Complaints	None			.42	47
Choice	None			.28	58
Control	None			.11	58
Sleep	None			.05	135
Tolerance	None			.35	31
Headache	None			.16	33

Table 21

Results for Prior Commitments

Variables	Singles 0, 1, > 1	Doubles 0, 1, > 1	Dorms 0, 1, > 1
Educational Activities	1.53, 1.79, .74 F(2,236)=5.74(.01)	2.11, 1.31, .95 F(2,148)=3.63(.05)	2.20, 1.23, 1.12 F(2.237)=4.86(.01)
Ideal Score			15.58, 16.19, 8.20 F(2,73)=3.53(.05)
Perceived Control		6.20, 7.91, 4.0 F(2,32)=3.77(.05)	
Room Rating			15.82, 14.19, 10.72 F(2,214)=8.14(.001)

Table 22

Results for Duration of Past Confinements

Variables	Singles <64,>65	Doubles <35,>36	Dorms <39,>40
Perceived Crowding			2.91, 3.39 F(1,235)=15.75(.001)
Educational Activities	1.63,1.00 F(1,239)=5.46(.02)	1.80, 1.01 F(1,147)=4.79(.05)	1.91, 1.17 F(1,235)=6.40(.02)
Tolerance Score		13.13, 11.05 F(1,74)=5.94(.05)	
Ideal Score		16.49, 10.08 F(1,74)=4.45(.05)	
Crowding Complaints			.48, .76 F(1,237)=5.48(.02)
Noncrowding Complaints			.18, .32 F(1,237)=3.92(.05)
Mood	22.33, 26.02 F(1,99)=4.47(.05)		
Perceived Choice			4.60, 3.82 F(1,130)=6.10(.02)
Room Rating			16.22, 11.13 F(1,213)=24.28(.001)
Illness Rate (>6 weeks)		.23, .33 F(1,150)=4.09(.05)	

both doubles and dormitory living more intolerable.

The results of the univariate analysis for custody nicely mirror the multivariate analyses. Higher custody is related to favorable reaction to housing and lowered illness rate in both singles and dorms. Elevated blood pressure was observed with higher custody levels in singles (Table 23).

The general pattern for criminal history (prior confinement) is that more extensive criminal history is related to negative reactions to prison housing, especially dormitories. The results for custody are difficult to interpret since custody reflects both the criminal history of the inmate and institutional differences. In general, less severe custody (less severe criminal history and less restrictive prison environment is related to positive reactions. While this result fits with prior expectations, the elevated blood pressure in for less secure custody inmates was unexpected. This finding cannot be attributed to possible confounding with age since the effect remains when this factor is controlled (e.g., Table 32). Possibly the higher levels of activity of inmates in less secure environments may be associated with elevated blood pressures during the day. For example, in a study of jails it was found that inmates who had just returned from work outside the institution had higher blood pressures (Paulus & McCain, 1983).

Length of Confinement

Although the major focus of our project has been on the effects of crowding, much of our data is also pertinent to the issue of prison confinement. A lot of research has been conducted on the impact of being confined in prisons (Bukstel & Kilman, 1980; Flanagan, 1981; McKay, Jayewerdere, & Reedie, 1979). Although we cannot compare our inmates with non-inmate groups, we can examine the impact of length of present confinement and length of previous confinements.

The length of time each inmate has spent in his present prison or during his present sentence and the length of time he expects to remain are three

Table 23

Results for Custody Level

Variables	Singles 1,2,3,4	Doubles 1,2,3,4	Dorms 1,2,3,4
Diastolic Blood Pressure	55.2, 61.1, 63.6, 64.7 F(3,239)=5.91(.001)		
Systolic Blood Pressure	111.4, 120.1, 118.4, 118.3 F(3,239)=3.66(.02)		
Headache	.35, .53, .46, .22 F(3,130)=2.71(.05)		
Room Rating	17.4, 23.4, 24.8, 26.6 F(3,239)=7.55 (.001)		10.6, 12.8, 13.5, 18.3 F(3,199)=3.11(.03)
Total Illness Rate	.12, .35, .22, .14 F(3,233)=4.42(.01)		1.16, .26, .29, .22 F(3,190)=3.10(.03)
Perceived Crowding		3.2, 3.2, 3.4, 2.4 F(3,142)=5.31(.01)	3.3, 3.3, 3.2, 2.4 F(3,217)=4.52(.01)
Sports			2.0, 3.6, 2.4, 2.5 F(3,218)=4.43(.01)

Note: Custody levels are coded as follows: 1 = closed, 2 = medium, 3 = minimum, 4 = community

time-related variable that may influence reaction to the prison environment. Having been in the prison for a long time may be associated with positive reactions because of increasing familiarity and with feelings of control or mastery over the environment. With increased time in prison, the inmate may learn the "rules of the game" in the prison and may learn to cope with its deprivations and dangers. Another time related factor is the amount of time the inmate expects to stay in prison. Possibly inmates who expect to serve a long time may try to make their stay more tolerable by developing more positive attitudes toward the environment (cognitive re-evaluation). Weeks in prison was measured by the recorded time in the present prison and the recorded time on present sentence. Time left on sentence was measured by reported months left to serve. A multiple regression analysis for all housing was done in which background and criminal history were entered first, and then the time variables were entered simultaneously. In this analysis greater number of weeks in prison was related only to a decline in illness rate. Weeks committed was related to a decline in reported headache problems. Time left to serve was related to more complaints about crowding (Table 24). In general, the addition of the time factors does not add much to the variance accounted for by all variables.

A separate analysis for singles revealed that longer time in prison was related to greater feelings of crowding, more negative-room rating and lower feelings of choice. Longer weeks committed on present sentence was related to lower feelings of choice but also lowered systolic blood pressure (Table 25). In dorms increased weeks in prison was related only to increased feelings of choice, while weeks committed was related to greater feelings of choice and less problems with headaches. Longer months left to serve was related to higher illness rate, lower room rating and more crowding complaints (Table 26). In general the above analyses indicate for singles, increased time in prison to committed was related to negative psychological reactions, but lowered blood

Table 24

Contribution of Commitment Length Variables in Multiple Regression Analyses

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	Weeks in Prison	-.12	.03	.03	576
Perceived Crowding	None			.11	576
Room Rating	None			.13	576
Systolic Blood Pressure	None			.05	576
Diastolic Blood Pressure	None			.11	576
Illness (>6 weeks)	None			.02	576
Mood	None			.06	176
Tense/ Stimulated	None			.11	176
Crowding Complaints	None			.20	101
Other Complaints	None			.12	101
Choice	None			.10	176
Control	None			.05	176
Sleep	None			.04	379
Tolerance	None			.16	106
Headache	Weeks Committed	-.19	.02	.17	201

Table 25

Contribution of Commitment Length Variables in Multiple Regression Analyses for Singles

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	None			.08	155
Perceived Crowding	Weeks in Prison	.21	.01	.09	156
Room Rating	Weeks in Prison	-.16	.05	.16	156
Systolic Blood Pressure	Weeks Committed	-.21	.02	.05	157
Diastolic Blood Pressure	None			.17	157
Illness (>6 weeks)	None			.09	95
Mood	None			.15	58
Tense/ Stimulated	None			.10	58
Crowding Complaints	None			.20	40
Other Complaints	None			.21	40
Choice	Weeks in Prison	-.40	.01	.16	57
	Weeks Committed	-.40	.01		
Control	None			.18	57
Sleep	None			.04	157
Headaches	None			.14	77
Tolerance	Too Few				

Table 26

Contribution of Commitment Length Variables in Multiple Regression Analyses for Dorms

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	Months Left to Serve	.28	.01	.09	120
Perceived Crowding	None			.14	115
Room Rating	Months Left to Serve	-.20	.05	.16	116
Systolic Blood Pressure	None			.11	130
Diastolic Blood Pressure	None			.18	130
Illness (>6 weeks)	None			.04	85
Mood	None			.18	59
Tense/ Stimulated	None			.28	59
Crowding Complaints	Months Left to Serve	.32	.05	.33	46
Other Complaints	None			.43	46
Choice	Weeks in Prison Weeks Committed	.31 .29	.03 .04	.25	59
Control	None			.11	59
Sleep	None			.08	130
Tolerance	None			.37	31
Headaches	Weeks Committed	-.53	.05	.18	31

pressure. Longer time in dorms was related to some positive reactions, while time left to serve (and thus presumably less time already in prison) was related to negative reactions.

The univariate analyses revealed a somewhat similar pattern of results. In singles, length of confinement in the present prison was associated with increased feelings of crowding and negative environment rating. Yet illness complaint rate and number of complaints were lower with longer confinement. In contrast, in doubles, systolic blood pressure and complaints were higher with greater confinement. Length of confinement in doubles was also associated and higher feelings of control. In dorms, length of confinement was associated with lower involvement in club activities and more complaints (Table 27). For total time of confinement or commitment on the present sentence (instead of in present institution) most of the effects of commitment were also obtained with singles. Longer time of confinement on present sentence was related to lower blood pressure, lower illness complaint rate and lower complaints about crowding and other factors. However, perceived crowding was higher and room rating lower for inmates who had a longer confinement on their present sentence. Longer time of commitment was also related to talking with others. For residents of doubles, increased length of commitment was related to negative room ratings, while for dormitory residents it was associated with more problems sleeping, fewer religious activities and lower diastolic blood pressure (Table 28). Months left to serve was associated only with a few significant results. Dorm residents who had much time left to serve had lower ideal scores, while double residents with a lot of time left were involved in more religious activities (Table 29).

Summary

Residents in singles provide the most straightforward way of assessing the impact of confinement factors. These inmates have generally been confined

Table 27

Results for Weeks in Present Prison

Variables	Singles ≤56,≥56	Doubles ≤26,≥26	Dorms ≤21,≥21
Systolic Blood Pressure		114.88, 119.80 F(1,142)=5.80(.02)	
Perceived Crowding	1,66, 1.94 F(1,238)=5.19(.05)		
Club Activities			.67, .31 F(1,234)=5.38(.05)
Crowding Complaints		.15, .38 F(1,143)=4.64(.05)	
Other Complaints		.03., .17 F(1,143)=4.84(.05)	.17, .34 F(1,237)=5.49(.02)
Total Complaints	.61, .38 F(1,242)=4.02(.05)		
Tense/ Stimulated	8.41, 9.81 F(1,108)=5.01(.03)		
Perceived Control		4.14, 7.04 F(1,32)=4.21(.05)	
Room Rating	25.29, 22.29 F(1,237)=5.37(.05)		
Illness Rate (>6 weeks)	.27, .14 F(1,143)=4.37(.05)		
Total Illness Rate	.26, .14 F(1,231)=7.13(.01)		

Table 28

Results for Length of Present Commitment

Variables	Singles ≤62,≥63	Doubles ≤42,≥43	Dorms ≤28,≥29
Systolic Blood Pressure	119.76, 115.16 F(1,227)=7.58(.01)		
Diastolic Blood Pressure	63.39, 60.11 F(1,227)=4.61(.05)		64.72, 60.94 F(1,217)=6.30(.02)
Perceived Crowding	1.69, 1.98 F(1,228)=5.49(.02)		
Sleeping Problems			.48, .65 F(1,220)=5.68(.02)
Religious Activities			1.07, .63 F(1,218)=4.50(.05)
Talking	2.66, 2.40 F(1,231)=4.20(.05)		
Crowding Complaints	.38, .21 F(1,232)=4.02(.05)		
Noncrowding Complaints	.24, .11 F(1,232)=4.76(.05)		
Room Rating	24.85, 21.88 F(1,227)=5.13(.05)	13.99, 11.45 F(1,131)=3.96(.05)	
Illness Rate (>6 weeks)	.14, .09 F(1,141)=4.39(.05)		
Total Illness Rate	.26, .14 F(1,226)=6.89(.01)		

Table 29

Results for Reported Months Left to Serve on Sentence

Variables	Singles <14,>15	Doubles <13,>14	Dorms <12,>13
Ideal Score			14.74, 8.25 F(1,74)=6.26(.02)
Religious Activities		.58, 1.09 F(1,149)=4.83(.03)	

somewhat longer than other inmates and they are not exposed to crowded housing conditions. The length of present confinement indeed seems to be a major factor for singles residents. An increased number of weeks of commitment is related to lower blood pressures and illness and fewer complaints about crowding. This suggests a process of adapting or becoming more comfortable with one's environment. However, increased time in prison for single inmates is also related to increased negative evaluation of the housing and higher feelings of crowding. This pattern of findings suggests that while inmates may adjust to prison over time, they also develop increasingly negative attitudes toward the actual physical environment. The above pattern of results is obtained whether one examines total confinement on the present sentence or just present prison confinement.

As might be expected, the results for doubles and dorms were less clear and consistent. In doubles, increased length of present commitment was related only to negative room rating. Time in present prison, on the other hand, was related to increased systolic blood pressure and increased complaints, but higher feelings of control. In dorms, increased time of present commitment was related to lower diastolic blood pressure greater feelings of choice and fewer problems with headaches, but greater problems with sleeping. The results for doubles and dorms are consistent with those of the singles in showing apparent adaptation along some dimension, but increased negativety along others. However, the results for doubles and dorms are not as clear and compelling as for the singles.

Effects of Housing Type

Thus far we have been concerned with the effects of background factors in predicting reactions to prison housing. In contrast, in past papers our emphasis has been on demonstrating the effects of housing type, while either ignoring or controlling for such background factors. Most of our analyses

concerned the relative effects of living in open dormitories, doubles or singles. These analyses were done for individual prisons. Table 30 presents the results of such analyses for the combined data of six prisons. These analyses show again that dormitories and doubles are perceived as more crowded and are rated more negatively on various dimensions than singles. Dormitory residents have higher illness complaints than do residents of doubles or singles. As before, no effects were obtained for social, religious and educational activities. Two measures which previously had not shown differential effects were shown to be influenced by housing type with the larger sample. Feelings of control over others were relatively lower in doubles and dorms. Mood state was also influenced, with stimulated/tense feeling scores being more negative in the doubles and dorms than in the singles. Several additional measures which were not available for previous analyses also showed effects. Dormitory residents reported more problems with headaches. They also expressed higher tolerance and ideal levels on the dormitory test than residents of singles and doubles. These findings indicate that both doubles and dormitories are similarly negative in their impact on feelings of crowding, evaluation of housing, mood state and feelings of control. However, dormitory residents had higher illness complaint rates and more problems with headaches than both the residents of singles and doubles. Thus, while the residents of doubles and dorms may find their housing similar unpleasant, additional tension and strain of dormitory living may result in an increase in more serious stress-related conditions such as illness and headaches.

It is also interesting to note that dormitory residents express somewhat higher tolerance of crowding than the other residents. Yet in spite of the heightened tolerance, these residents have elevated negative psychological and stress-related reactions.

As can be seen toward the bottom of Table 30, residents of the three housing

Table 30

The Effects of Different Housing Types

Variables	Single	Double	Dorm	F-value	p-value
Total Illness Rate	.18	.17	.26	4.10	.02
Illness Rate (≤ 6 weeks)	.23	.18	.28	3.28	.04
Illness Rate (> 6 weeks)	.11	.15	.21	8.30	.001
Perceived Crowding	1.83	3.13	3.08	113.67	.001
Room Rating	23.42	12.79	14.18	80.90	.001
Tense/Stimulated	24.22	20.40	19.78	9.08	.001
Perceived Control	8.12	6.53	7.08	3.28	.04
Headache	.38	.41	.74	13.67	.001
Tolerance Score	10.9	9.0	12.3	10.75	.001
Ideal Score	6.2	2.9	13.2	15.98	.001
Age	34.89	32.59	32.63	5.16	.01
Last Grade in School	10.46	10.26	9.81	3.35	.05
Prior Commitments	2.10	1.11	1.82	8.21	.001
Months Left to Serve	21.19	17.93	16.69	3.63	.03
Duration of Previous Confinement	123.39	94.67	84.59	4.34	.01
Weeks on Present Sentence	92.21	54.91	46.05	32.23	.001
Weeks in Present Prison	69.55	34.63	28.85	63.54	.001
Weeks in Present Housing	27.06	17.11	18.73	6.64	.01
Custody Level	2.14	2.29	2.39	13.87	.001

types also differ in some of the characteristics we have previously examined. Differences in reactions to housing may thus be partially attributable to these factors. To assess this problem, a regression analysis was done in which all of the predictor variables used in the previous regression analyses were entered simultaneously with two housing contrasts (singles vs. doubles and dorms vs. singles and doubles). This analysis indicates that the housing effects are not attributable to the influence of the other predictor variables (Table 31). Housing effects for the tense/stimulated and control items were not obtained because of the similarity of the results in the doubles and dorms for these items. (Illness rate less than six weeks and ideal were not included in this analysis.) It should also be noted that slight effects of housing on blood pressure were also obtained. This effect apparently reflects the slightly elevated blood pressure of dormitory residents (systolic, 118.7 vs. 117.8; diastolic, 62.8 vs. 61.5), which becomes significant when controlling for other variables. When age is also entered into the multiple regression analyses, the results remain essentially the same (Table 32).

Although all of the prior multiple regression analyses involved the simultaneous inclusion of individual predictor variables, the factor analysis indicated that these variables reflect to some extent a limited set of factors. One common approach in multivariate regression is to use the factor scores in regression analysis. For the sake of completeness, this approach was taken in one set of analysis, using the factors in Table 2. The results of those analysis are shown in Tables 33 to 35. There results are generally consonant with those from the individual variable analyses.

Weeks in Present Housing

The amount of time spent in a particular housing unit may influence a person's reactions to this unit. Our past findings have found increased sensitivity to crowding with increased time of exposure to such conditions.

Table 31

Contribution of Predictor and Housing Variables in Multiple Regression Analyses for Singles, Doubles and Dorms

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	Months Left	.11	.03		
	Weeks in Prison	-.13	.04		
	Dorms/Rest	-.13	.04	.06	454
Perceived Crowding	Weeks in Prison	.11	.03		
	Custody	-.16	.001		
	Parent Occupation	.14	.01		
	Singles/Doubles	-.41	.001		
	Dorms/Rest	-.27	.001	.33	450
Room Rating	Custody	.17	.001		
	Parent Occupation	-.10	.03		
	Singles/Doubles	.37	.001		
	Dorms/Rest	.17	.001	.29	450
Systolic Blood Pressure	Custody	.16	.01		
	Parent High School	.12	.03		
	Hometown/Adult	-.11	.05		
	Dorms/Rest	-.11	.03	.07	475
Diastolic Blood Pressure	Priors	.16	.01		
	Weeks Committed	-.17	.01		
	Custody	.19	.001		
	Weeks in Prison	.12	.05		
	Dorms/Rest	-.11	.03	.13	475
Illness (>6 weeks)	Dorms/Rest	-.19	.03	.06	287
Mood	None			.12	157
Tense/Stimulated	None			.13	157
Crowding Complaints	Hometown/Child	-.26	.01		
	Grade in School	.20	.05	.23	119
Other Complaints	Hometown/Child	.27	.02	.12	119
Choice	Grade in School	-.24	.01	.11	157

Table 31 (continued)

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Control	None			.07	157
Sleep	Weeks in Prison	.12	.05	.03	475
Tolerance	Dorms/Rest	-.33	.01	.26	83
Headaches	Dorms/Rest	-.33	.001	.23	150

Table 32

Contribution of Predictor and Housing Variables in Multiple Regression Analyses for Singles, Doubles and Dorms (including age)

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	Months Left	.11	.03		
	Weeks in Prison	-.13	.05		
	Dorms/Rest	-.11	.04	.06	440
Perceived Crowding	Custody	-.15	.001		
	Parent Occupation	.15	.01		
	Weeks in Prison	.12	.03		
	Singles/Doubles	-.41	.001		
	Dorms/Rest	-.26	.001	.33	436
Room Rating	Age	.15	.001		
	Custody	.13	.01		
	Parent Occupation	-.10	.04		
	Singles/Doubles	.37	.001		
	Dorms/Rest	.26	.001	.31	436
Systolic Blood Pressure	Age	.23	.001		
	Weeks Committed	-.11	.05		
	Custody	.12	.03		
	Parent High School	.12	.02		
	Dorms/Rest	-.10	.05	.12	436
Diastolic Blood Pressure	Age	.42	.001		
	Weeks Committed	-.18	.001		
	Custody	.10	.04		
	Weeks in Prison	.12	.03		
	Dorms/Rest	-.09	.04	.28	461
Illness (>6 weeks)	Dorms/Rest	-.20	.01	.06	279
Mood	Age	.22	.02	.15	155
Tense/Stimulated	Age	.19	.04		
	Priors	-.19	.05	.18	155
Crowding Complaints	Hometown/Child	-.24	.02		
	Grade in School	.19	.05	.23	118
Other Complaints	Grade in School	.26	.02	.12	118
Choice	Grade in School	-.26	.01	.12	155

Table 32 (continued)

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Control	None			.08	155
Sleep	Weeks in Prison	.12	.05	.03	461
Tolerance	Dorms/Rest	-.36	.01		
	Age	-.27	.04	.33	81
Headaches	Dorms/Rest	-.33	.001	.23	147

Table 33

Multiple Regression With Factor Scores for All Housing

Criterion Variables	Predictor Variables	Beta	Significance	R^2 for all Variables	N
Total Illness	Custody	-.14	.01	.04	353
Perceived Crowding	Custody	-.14	.01		
	Socioeconomic	.14	.01		
	Weeks in Prison	.11	.03	.33	344
Room Rating	Custody	.16	.001		
	Weeks in Prison	-.12	.02		
	Age	.11	.03	.33	344
Systolic Blood Pressure	Custody	.15	.01		
	Socioeconomic	.13	.01		
	Age	.21	.001	.01	364
Diastolic Blood Pressure	Custody	.14	.01		
	Age	.39	.001	.19	364
Mood	Socioeconomic	-.18	.05	.16	133
Choice	Criminal History	-.19	.05	.10	131

Table 34

Multiple Regression With Factor Scores for Singles

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	Socioeconomic	-.16	.05		
	Hometown Size	.19	.03		
	Age	-.20	.03	.10	152
Room Rating	Custody	.22	.01		
	Hometown Size	.18	.03		
	Criminal History	.17	.05	.16	154
Systolic Blood Pressure	Weeks in Prison	-.20	.02		
	Age	.26	.01	.12	154
Diastolic Blood Pressure	Custody	.20	.02		
	Age	.39	.001	.23	154
Choice	Weeks in Prison	-.39	.01	.22	56

Table 35

Multiple Regression With Factor Scores for Dormitories

Criterion Variable	Predictor Variable	Beta	Significance	R^2 for all Variables	N
Total Illness	Custody	-.26	.01	.08	115
Perceived Crowding	Custody	-.21	.03		
	Socioeconomic	.21	.03	.13	113
Room Rating	Custody	.26	.01		
	Hometown Size	-.22	.03	.15	113
Systolic Blood Pressure	Custody	.19	.04	.13	125
Diastolic Blood Pressure	Age	.41	.001	.27	125
Crowding Complaints	Weeks in Prison	-.34	.05	.17	46
Other Complaints	Socioeconomic	-.35	.35	.27	46

Thus, in the dormitories, and possibly doubles, increased time in housing should be associated with increasingly negative reactions. Yet little support for this hypothesis is evident. Increased time in dorms was associated with elevated diastolic blood pressures and a lower level of club activities, but also with lowered illness complaint rate (Table 36). In fact, the most consistent results was a lowering of illness complaint rated with increased time in housing (Figure 2). This suggests that initial exposure to a particular housing unit, with it's associated exposure to new inmates (in the dorm or hallway), is associated with a relatively high level of stress and illness. Continued time in housing with the associated increased familiarity with nearby inmates may lead to a lowering of stress and illness. Yet, the failure of the various housing evaluation and mood scales to be related to time in housing would seem to be inconsistent with such an interpretation. Figures 3 to 5 show the impact of time in housing for three such scales. It is evident that there is little change as a function of time. One of the questionnaire items did yield an effect of time over this period-perceived control (Figure 6). This is of great interest since perceived control may tap the experience of increased familiarity and social structure which may be associated with increased time in housing unit, especially in dormitories.

Illness[2]

One of the most important measures in our research is illness complaint rate. This measure consists of the complaints and associated diagnoses recorded by physicians or physicians assistants when inmates visit the medical clinic. Each complaint which occurred while inmates were in their present housing unit was recorded for a period of up to six months. Multiple complaints during a visit were coded as distinct complaints (in prior studies we coded only visits). The nature of each visit was coded and the resulting variety of complaints are shown in Table 37. The number of categories of complaints was reduced by

Table 36

Results for Recorded Weeks in Present Housing

Variables	Singles ≤15, ≥16	Doubles ≤13, ≥14	Dorms ≤14, ≥15
Diastolic Blood Pressure		57.7, 63.3 F(1,153)=8.24(.01)	
Club Activities			.67, .28 F(1,242)=6.39(.02)
Talking	2.7, 2.4 F(1,208)=5.62(.02)		
Crowding Complaints		.20, .61 F(1,100)=7.98(.01)	
Total Illness Rate	.35, .13 F(1,198)=19.45(.001)	.29, .13 F(1,94)=4.06(.05)	.51, .18 F(1,216)=3.81(.06)

Figure 2. Effect of time in housing on illness rate.

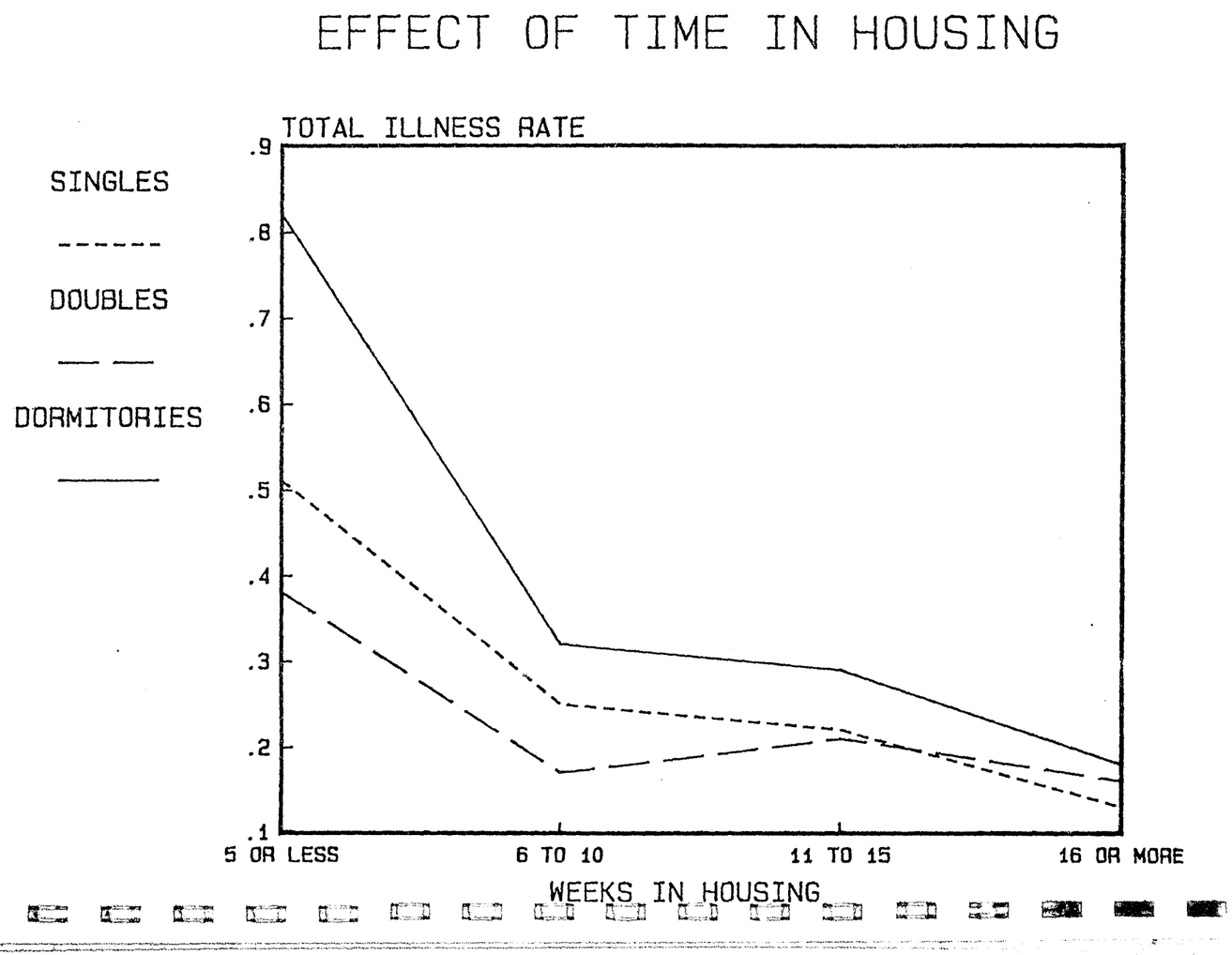


Figure 3. Effect of time in housing on perceived crowding.

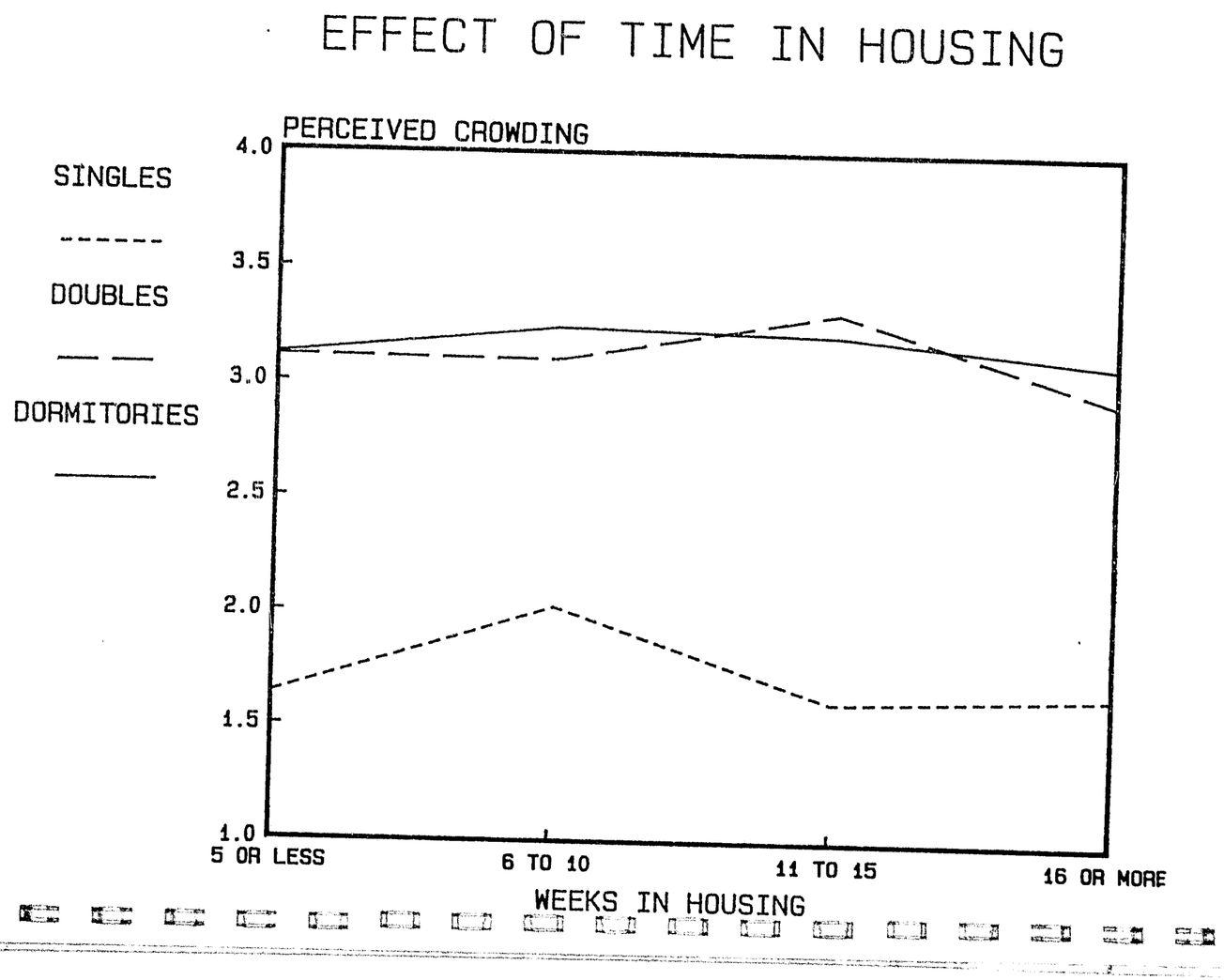


Figure 4. Effect of time in housing on room rating.

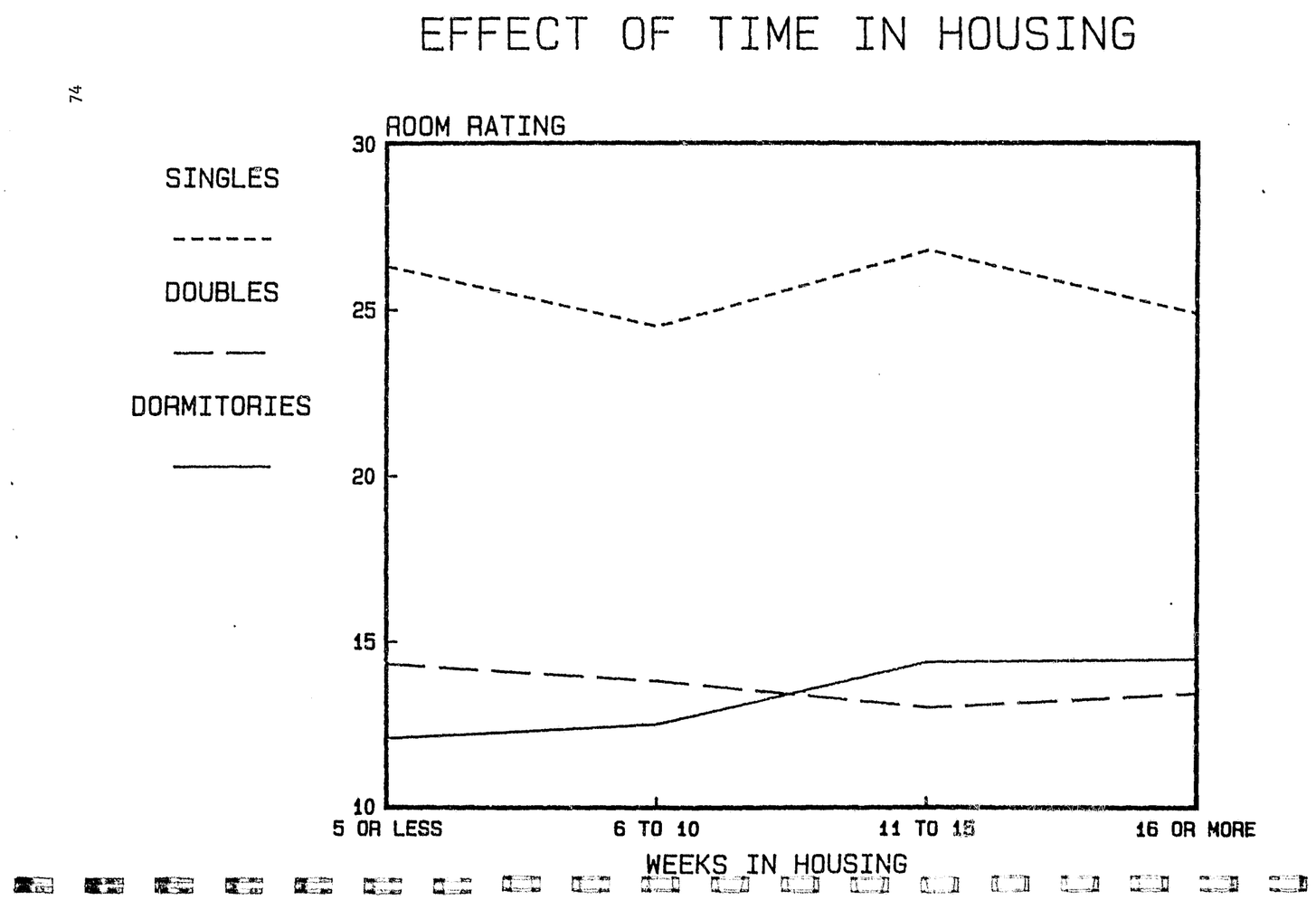


Figure 5. Effect of time in housing on mood state.

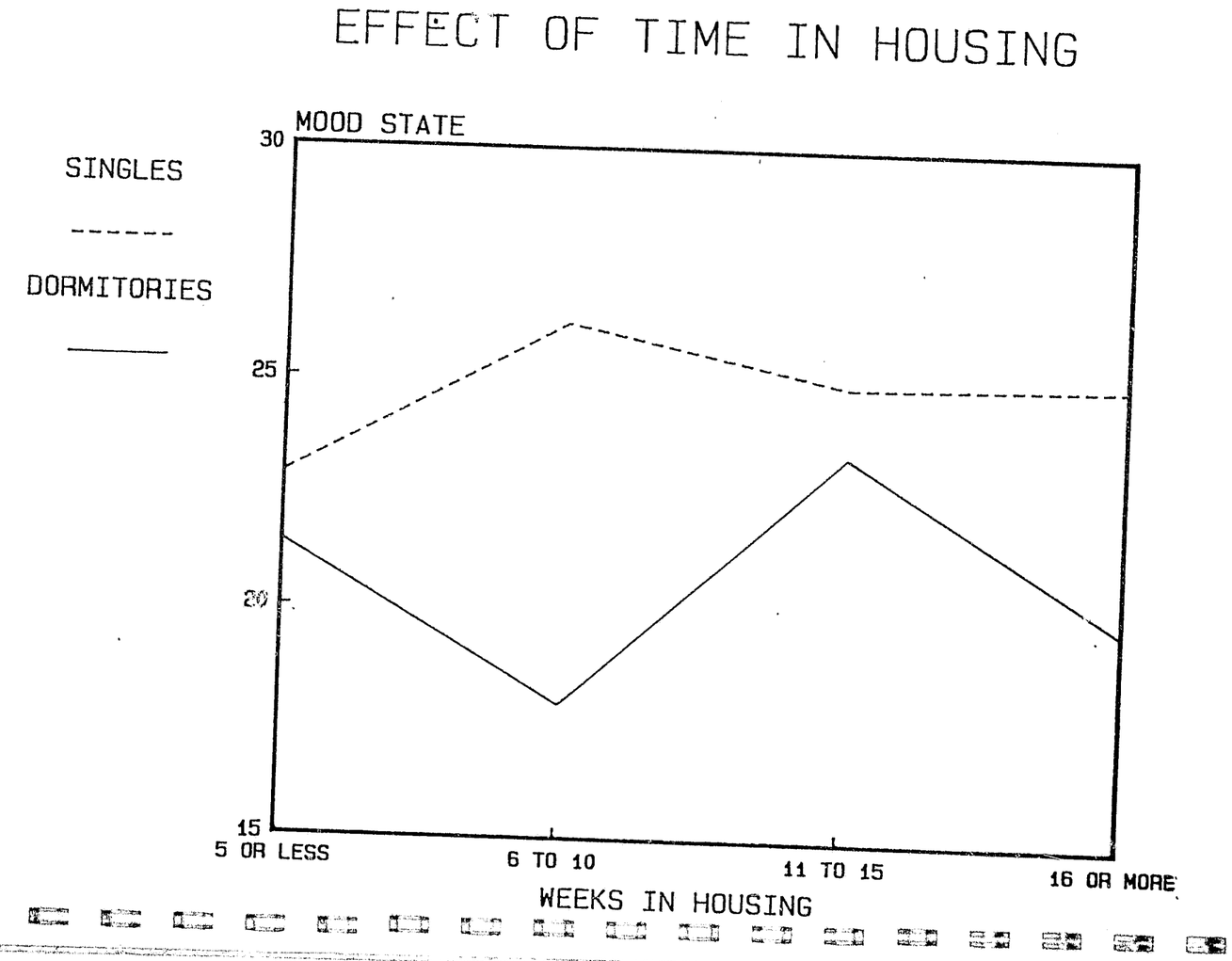


Figure 6. Effect of time in housing on perceived control.

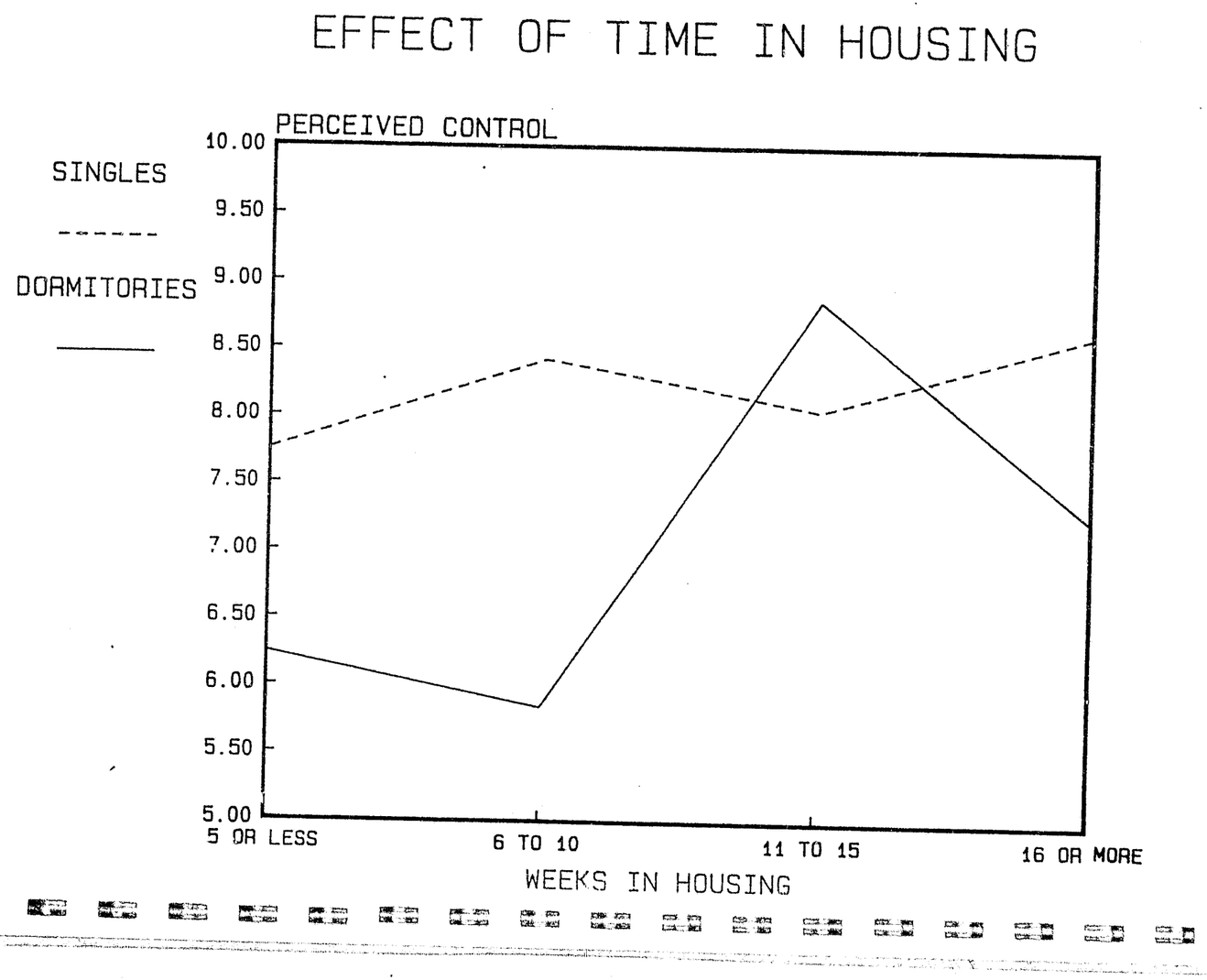


Table 37

Illness Symptoms Encountered in the Sample and Categorization According to Physician Survey

	NC	STR	VER
Infectious/Parasitic:			
Discharge			x
Genital sores			x
Venereal warts/venereal disease			x
Neoplasms:			
Cyst/tumor/lump	x		x
Endocrine/Nutritional/Metabolic:			
Diet pills/problems	x	x	x
Blood:			
Hemorrhoid	x		x
Mental:			
Nerves/anxiety	x	x	
Psychological	x	x	
Insomnia/nightmares	x	x	
Depression/schizophrenia	x	x	
Nervous/System/Sense:			
Headache/migraine	x	x	
Senses/eye/ear	x		x
Strep/sore throat/laryngitis/tonsilitis			x
Circulatory:			
Heart	x		x
Blood pressure	x	x	x
Circulatory problems/varicose veins/phlebitis	x		x
Respiratory:			
Rhinitus/sinus/nasal			x
URI/breathing/emphysema			x
Asthma	x	x	x
Cough/cold/flu			x
Chest congestion/bronchitis			x
Allergy/hayfever	x		x

Table 37 (continued)

	NC	STR	VER
Digestive:			
Stomach/abdomen	x	x	
Ulcer	x	x	x
Gas/constipation/bowels/diarrhea	x	x	
Loss of appetite (anorexia)/nausea/vomiting/ indigestion	x	x	
Genitourinary:			
Urine infection/pain	x		x
Gastrointestinal problems/kidney/liver	x		x
Pregnancy/Childbirth/Female:			
Birth control (pills & devices)			
Menstrual problems	x	x	
Female problems/breast/vaginal	x		
Skin/Subcutaneous Tissue:			
Hives	x	x	x
General skin problems/rash/itch/fungus (athletes foot & jock itch)/exema/dandruff			x
Acne	x		x
Sunburn	x		x
Blisters/warts/corns	x		x
(Ingrown) nails	x		x
Skin lesions/boils	x		x
Musculoskeletal:			
Joints	x		
Bones/limbs/hands/fingers	x		
Muscle (spasms)	x		
Neck/shoulders	x		
Back pain	x	x	
Bursitis/arthritis/tendonitis	x		x
Hernia	x		x
Hip/flank pain/side pain	x		
Tailbone/buttock pain/rectal	x		
Symptoms/Signs/Ill Defined Conditions:			
Chest pain	x	x	
Foot pain/problems	x		
Swallowing (obstruction in throat)	x		
Scrotum/penis/groin/prostate pain	x		
Malaise	x	x	

Table 37 (continued)

Symptoms/Signs/Ill Defined Conditions (Continued):	NC	STR	VER
Swelling	x		x
Sweating	x	x	
Dizziness/fainting	x	x	
Virus			
Swollen glands			x
Parasites/crabs, lice/trichinosis	x		x
Malingering			
Jaw/mouth/lip (pain/sore)	x		
Body aches/pain/numbness/fever/chills/tired/weak.			
Epileptic attack			
Infection			x
Cramps	x		
Diabetes			
Renew medication			
Dental			
Injury			

Illegible entry

NC = Noncontagious
STR = Stress sensitive
VER = Verifiable

Criterion - 75% agreement

subsuming sets of complaints (especially infrequent ones) into broader categories. The set of complaint types in Table 37 was subjected to factor analyses to determine the degree of commonality among the various complaints. As seen in Table 38, the correlations among the complaints are described quite well by a four factor solution. The first factor appears to consist of a wide variety of complaints, many of which are often seen as stress related. The second factor encompasses primarily objective/verifiable symptomatology. Factor 3 consists mainly of pain related complaints. Factor 4 involves mostly psychological problems. Based on this factor analysis, each inmate was assigned factor scores. These scores were subjected to an analysis of variance to determine which set of illness complaints best differentiated among the three different housing types. Significant effects were found only for factors 2 and 3 (Table 39). It is interesting to note that factor 2 consists of many objectively verifiable conditions, while factor 3 includes many pain related complaints. These results suggest that the illness complaint effect we have observed in our research may in fact reflect some real physical pathology. We have argued elsewhere for this conclusion based on converging evidence from other studies showing crowding to be a stressful condition and from studies documenting the health related effects of exposure to stress (Cox, Paulus, McCain, & Karlovac, 1982). Yet now we have additional evidence for a pathology conclusion on the basis of the nature of the illness complaints.

The verifiability interpretation of the illness results depends of course on the assumption that some symptoms are more easily verified as reflecting objective pathology than other symptoms. To assess this assumption, and to further evaluate the nature of our illness complaints, a number of health practitoners were asked to rate the major illness symptoms along four dimensions-verifiability, degree of contagiousness, stress sensitivity, and psychosomaticity (Appendix C). One sample consisted of physicians from three

Table 38

Categories and weights of the four factor solution for illness data

	I	II	III	IV
Eigenvalue	6.98	1.79	1.72	1.27
	.29 nerves, insomnia, anxiety, nightmares	.46 venereal problems	.56 miscellaneous	.47 nerves, appetite, insomnia, nightmares
	.62 headaches	.29 psychotic symptoms	.39 gas, constipation, bowels	
	.65 problems of eye, ear nose and throat	.44 circulation, heart	.84 urine infection, gastrointestinal, kidney, liver	.80 psychological, depression, schizophrenia
	.75 rhinitis/sinitis, nasal	.42 upper respiratory, allergy	.31 back & neck pain	.32 miscellaneous
	.30 upper respiratory, breathing, allergy, hayfever	.32 stomach, ulcer	.38 chest pain	.28 loss of appetite, nausea
	.29 asthma	.64 female problems	.46 foot pain	.33 gastrointestinal pain
	.64 cough, cold, flu	.46 joints, hernia	.62 scrotum, penis, groin	.61 malaise
	.26 Gas, constipation, loss of appetite	.55 bursitis, arthritis	.30 illegible entry	.35 swollen glands, bodyaches, chills, fever
	.56 vomiting, indigestion	.43 dizziness, fainting		
	.23 joints, bones, limbs, hands, fingers, muscle spasms, hernia, hip, flank, shin and sidepain, tailbone	.66 renew medicaton		
		.28 illegible entry		

Table 38 (continued)

	.26 backpain			
	.33 malaise			
	.42 dizziness			
	.65 sweating, virus, bodyaches & pain, numbness, fever, chills, tired, weak, swollen glands			
	.30 scrotum, penis			

Table 39

The Effects of Different Housing Types on Illness

Variables	Single	Double	Dorm	F-value	p-value
Total Illness Rate (All complaints)	.18	.17	.26	4.10	.02
Factor 2 Illness Rate (Verifiable)	.032	.041	.058	3.30	.04
Factor 3 Illness Rate (Pain Related)	.052	.042	.091	6.85	.002
Verifiable & Noncontagious Illness Rate	.025	.041	.054	5.95	.003

military clinics in the Washington, D.C. area. The other sample consisted of medical personnel in the clinics of six federal prisons. The results for the two samples were quite similar.[3] Since the questionnaire from the military clinics were all filled out by M.D.'s, these results were used as the basis for further analyses (Table 40). Using as criterion 75% agreement, symptoms were categorized as contagious, stress sensitive, verifiable and psychosomatic (most agreement within these categories was 90% or higher) (Table 37).[4] The impact of housing type on three of these illness categories (psychosomatic was eliminated because of similarity to stress sensitive) and a combined verifiable/ noncontagious category revealed only a significant effect for the verifiable/noncontagious category (Table 39). This result helps bolster the conclusion of the earlier analyses based on the factor scores. In both cases, symptoms charaterized by high verifiability most clearly differentiated among the housing conditions.

To control for and assess the influence of other predictor variables on the various illness categories, a multiple regression analysis was done for each of the factor and physician based illness categories, entering all of the predictor and the housing variables simultaneously. As seen in Table 41, significant effects for housing were obtained only for the pain category from the factor analysis and the verifiable category from the physician survey. Although there is a discrepancy between the univariate and multivariate analyses in terms of which specific set of illness categories is significant, in both sets of analyses only pain related and verifiable illness categories were significantly related to housing type. It can also be seen in Table 41 that the illness categories were not strongly related to other predictor variables. The psychological rate was lower with larger homesize and the stress-sensitive complaints were lower with less secure custody.

What conclusions can one derive from the above findings? The effects for

CONTINUED

1 OF 3

Table 40

Percentage of Agreement Among Physicians as to Whether a Particular Symptom is Likely or Unlikely to Fall into One of the Four Categories.

SYMPTOMS	1 CONTAGIOUS			2 STRESS SENSITIVE			3 VERIFIABLE			4 PSYCHOSOMATIC		
	L	?	U	L	?	U	L	?	U	L	?	U
Teeth, Gum Problems	0	0	100	20	15	65	95	5	0	0	15	85
Stomach Pains	20	5	75	100	0	0	25	10	65	100	0	0
Hives	10	0	90	80	5	15	75	5	20	50	30	20
Chest Pain	0	0	100	95	0	5	35	25	40	75	15	10
Feet Pain	0	5	95	40	20	40	35	10	55	20	25	55
Swallowing Pain	0	0	100	70	15	15	35	20	45	75	20	5
Fungus	95	5	0	20	10	70	100	0	0	0	0	100
Bone Problem	0	0	100	20	15	65	70	10	20	20	10	70
Joint Problem	0	0	100	40	20	40	60	10	30	25	15	60
Genital Discharge	100	0	0	10	5	85	100	0	0	0	5	95
Groin Pain	5	15	80	45	10	45	15	25	60	35	25	40
Headache	5	0	95	100	0	0	0	10	90	95	0	5
Bodily Injuury	5	5	90	40	15	45	100	0	0	10	20	70
Malaise	15	10	75	95	5	0	5	0	95	90	5	5
Rash, Itch	60	10	30	70	15	15	80	15	5	65	15	20
Acne	0	5	95	65	15	20	100	0	0	20	15	65
Asthma	0	0	100	85	0	15	100	0	0	40	5	55
Nausea	20	20	60	70	15	15	10	15	75	60	30	10
Nerves/Anxiety	5	5	90	100	0	0	20	20	60	95	0	5
Cold and Flu	95	0	5	40	20	40	80	5	15	5	25	70

Table 40 (continued)

Smell, Touch Problems	0	5	95	40	35	25	10	25	65	45	25	30
Limbs Problem/Pain	0	0	100	50	20	30	10	15	75	65	5	30
Ulcers	0	0	100	90	0	10	85	15	0	60	5	35
Swelling	0	10	90	10	20	70	100	0	0	10	20	70
Neck and Shoulder	0	5	95	60	35	5	30	30	40	50	25	25
Eye and Ear Problems	10	30	60	10	20	70	85	10	5	10	25	65
Sweating	5	0	95	90	5	5	50	5	45	70	10	20
Digestive Problems	10	5	85	90	10	0	10	15	75	80	20	0
Muscle Pain	5	0	95	60	20	20	20	15	60	50	25	25
Kidney Problems	0	5	95	10	5	85	90	5	5	0	0	100
Breathing Difficulty	10	15	75	80	5	15	65	15	20	65	15	20
Psychological Problem	5	5	90	100	0	0	30	30	40	95	0	5
Insomia	5	0	95	100	0	0	25	15	60	100	0	0
Nasal Sinus Problem	25	10	65	15	20	65	75	15	10	15	20	65
Hearing Voices	0	0	100	85	5	10	10	0	90	90	0	10
Depression	5	5	90	100	0	0	65	15	20	95	0	5
Dizziness, Fainting	10	0	90	95	0	5	15	20	65	90	5	5
Back Pain	0	0	100	90	10	0	30	15	55	75	20	5
Hemorrhoid	0	0	100	25	5	70	100	0	0	0	10	90
High Blood Pressure	0	5	95	85	0	15	100	0	0	35	15	50
Migraine	0	5	95	95	0	5	15	20	65	65	20	15
Cysts and Tumors	0	5	95	0	5	95	95	0	5	0	5	95
Urine Infection	25	0	75	5	5	90	100	0	0	0	5	95
Arthritis	0	0	100	35	10	55	85	5	10	15	20	65

Table 40 (continued)

Hernia	0	0	100	0	5	95	100	0	0	0	0	100
Heart Problems	0	0	100	60	10	30	95	5	0	20	25	55
Genital Sore	90	5	5	10	10	80	95	0	5	5	10	85
Virus	100	0	0	20	25	45	35	10	55	5	10	85
Dandruff	5	5	90	5	20	75	100	0	0	0	15	85
Menstrual Problems	0	0	100	85	10	5	25	25	50	45	15	40
Overweight	5	0	95	90	5	5	100	0	0	55	15	30
Sore Throat	95	0	5	15	10	75	75	15	10	5	20	75
Hallucinations	0	5	95	90	5	5	15	10	75	80	5	15

Table 41

Multiple Regression of Predictor Variables and Housing Type for Illness Categories.

Criterion Variable	Predictor Variable	Beta	Significance	N
Factor 1 (Stress)	None			
Factor 2 (Verifiable)	None			
Factor 3 (Pain)	Dorms vs. Rest	-.12	.05	357
Factor 4 (Psychological)	Homesize	-.11	.05	357
Contagious	None			
Stress Sensitive	Custody	-.16	.01	357
Verifiable	Dorms vs. Rest	-.12	.05	357
Verifiable/ Noncontagious	None			

the verifiable categories helps bolster the argument that crowded dormitory living does not produce merely more complaining about illness, but in fact has a real impact on health. The effect on pain-related complaints is also consonant with a stress based interpretation of the illness effects in dorms since four of the eight complaint types in this category (gas-constipation, back-neck pain, chest pain and gastrointestinal) were rated by physicians as likely to be stress related. It might be noted here that earlier analyses indicated that reports of headaches, another stress related category, were also strongly elevated in dormitories.

The failure to find significant effects for other illness categories is also of interest. Contagious illness may not be related to housing type because of the high level of contact with other inmates in work, recreational and dining settings. These provide ample opportunities for contagion. It should be noted that Gaes (1982) has found that residents of open dormitories are elevated in noncontagious but not contagious illness complaints, relative to inmates living in cubicles. In prisons and jails where inmates are confined to their quarters most of the day, contagious complaints may be elevated in more crowded housing. It is somewhat surprising, however, that stress-sensitive and psychological complaints are not related to housing type. Possibly these types of complaints reflect general reactivity to prison stress or a chronically elevated level of stress in certain inmates. The multivariate analysis provides some support for this since the stress-sensitive category was related to custody level and the psychological one to homesize.

To further examine the influence of other variables in the various illness categories, the correlation of these categories with the various psychological scales, activity measures (e.g., sports) and background or experiential variables was examined for inmates in dormitories (Table 42). Although this sort of analysis should be approached with caution, some interesting patterns do

Table 42

Correlations for Illness Categories in Dorms

Illness Category	Crowding	Mood	Stimulated/ Tense	Sports	Homesize	Custody	Prior Confinements	Duration of Priors	Weeks in Prison	Weeks in Housing	SAT	Beta IQ	Urban/Rural-Adult
Total Rate	.16	-.18	-.31*							-.20*		-.27*	
Greater than 6 weeks			-.23				.24*						
Factor 1 (Stress)	.16			-.16						-.14	-.22	-.19	
Factor 2 (Verifiable)				-.20*						-.17			.16
Factor 3 (Pain)										-.18*	-.25*		
Factor 4 (Psychological)													
Stress	.13			-.18		-.15							
Verifiable					-.15		.14	.22				-.23	
Contagious												-.26*	
Verifiable/ Noncontagious			-.25*		-.16			.14	-.14				

*$p < .01$, otherwise $p < .05$

emerge. Considering only those variables that are involved in three or more significant correlations, it is apparent that increased illness rates are associated with feelings of crowding, being tense/stimulated, low involvement in sport activities, increased confinements and time in housing and high IQ. It should also be noted that among the subcategories, the significant correlations occur primarily for the verifiable and stress-related complaints.

Urine Chemistry Study

The illness data provide strong support for the conclusion that dormitory crowding is a source of stress and detrimental to health. Yet direct physiological evidence for elevated stress in dorms is relatively weak. Consistent with prior research by D'Atri (1975) and D'Atri and Ostfeld (1975), we found that dorms were associated with a slight elevation in blood pressures when the influences of other variables are controlled. A more appropriate measure of physiological stress may be urinary catecholamines (epinephrine and norepinephrine). This measure has been used successfully in a wide variety of studies as a measure of increased sympathetic activity and hence a useful index of stress (Mason, 1975).

In our prior studies we had not been able to employ this measure because of financial constraints. However, during my stay in Washington an opportunity arose for such a study at Danbury FCI. The study was designed and carried out with the assistance of Andrew Baum and Marc Schaeffer of the Uniformed Services University of the Health Sciences and a team of researchers from the Federal Prison System headed by Gerald Gaes. Baum and Schaeffer provided the urine chemistry expertise and analyses.

Eighty inmates in three housing types provided urine samples when they arose in the morning, rated their feelings of crowding and control, and allowed access to their health records. The housing types were singles, single cubicles, and dorms. As seen in Figure 7 cubicle and dorm residents felt more crowded than

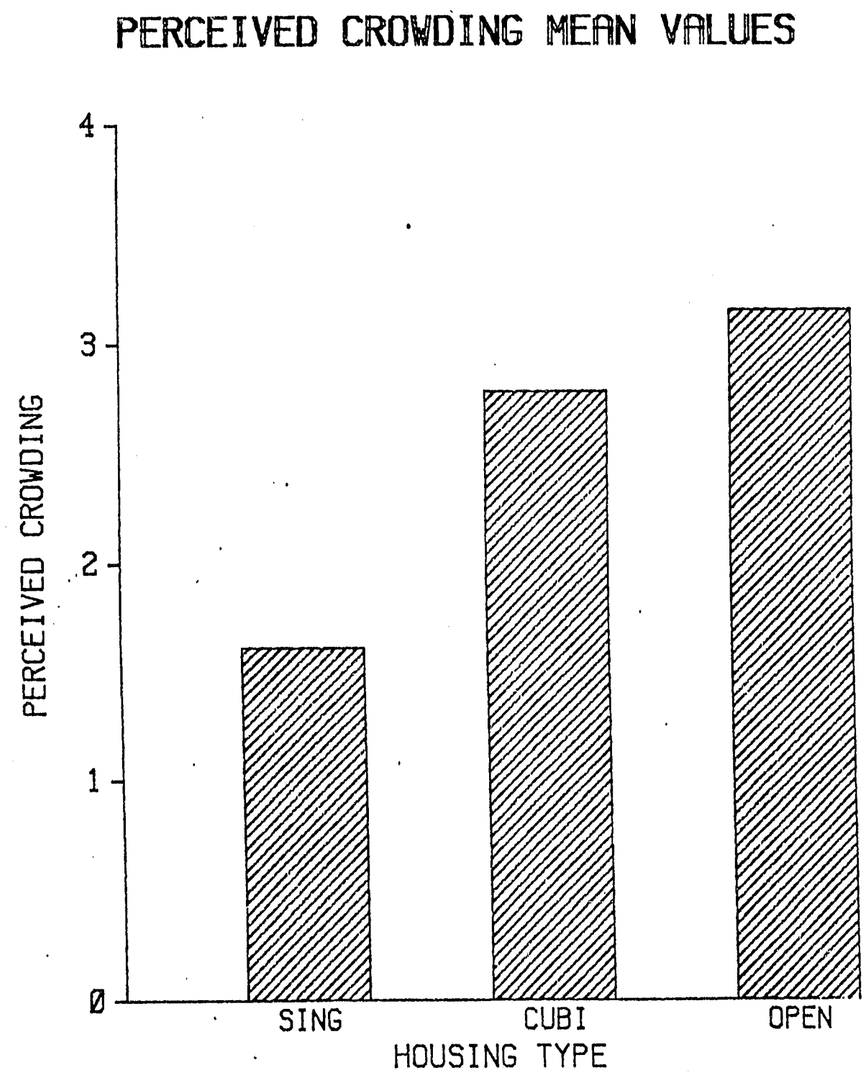


Figure 7. Perceived crowding effects in urine chemistry study.

singles residents, $F(2,81) = 11.63$ ($p < .001$). Most importantly, urinary epinephrine and norepinephrine levels were elevated in dorms relative to single cubicles and single rooms (Figures 8 and 9) ($F(2.73) = 7.35$, $p < .01$; $F(2,73) = 19.48$, ($p < .001$, respectively). This finding thus provides strikingly strong evidence for elevation of physiological stress levels in dorms. One problem with the Danbury data should be noted, however. Cubicles were associated with much higher illness complaints than both singles or dorms (Figure 10), $F(2,60) = 3.44$ ($p < .051$). This is of course contrary to our past findings. We know of no simple explanation for this finding, but part of the problem may lie in the small sample size of this study. Demonstration of illness effects in dorms generally has involved much larger sample sizes - 40 or more per housing condition. In our study the small sample size, especially in singles and cubicles (only 22 total), allows for a few subjects to greatly influence the overall illness rate.

Inmates were also asked to indicate what symptoms they had experienced in the last 90 days using a symptom checklist (Derogatis, 1977). There was no difference in total symptoms, but somatic symptoms (consisting of problems of a physiological or psychological nature) did show a nonsignificant trend to increase with decreased levels of privacy (Figure 11). Correlation analyses indicated that perceived crowding and control were significantly related to urine chemistry and several illness measures (Table 43).

The urine chemistry study has thus provided evidence of elevation of physiological indicants of stress in dorms. However, because this was an initial exploratory study, it needs to be replicated in other institutions and with larger samples.

Tolerance for Crowding

The prior sections have provided evidence both for stress-related effects of dormitory housing and of the influence of various personal and experiential

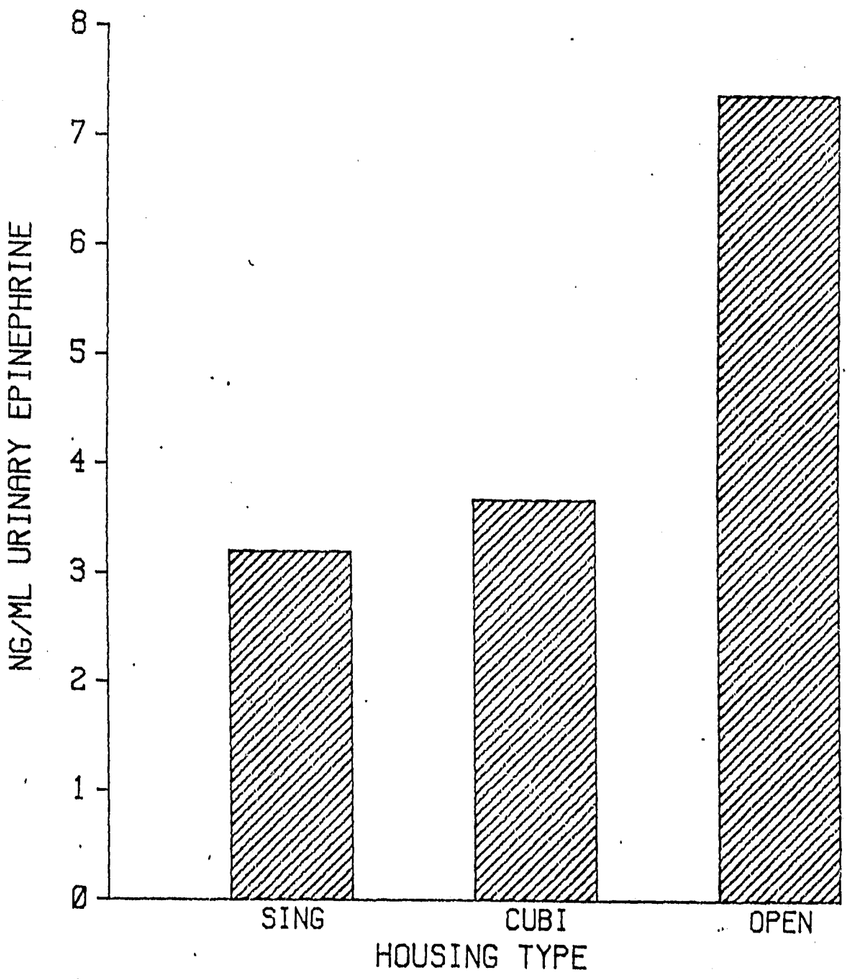


Figure 8. Urinary epinephrine as a function of housing.

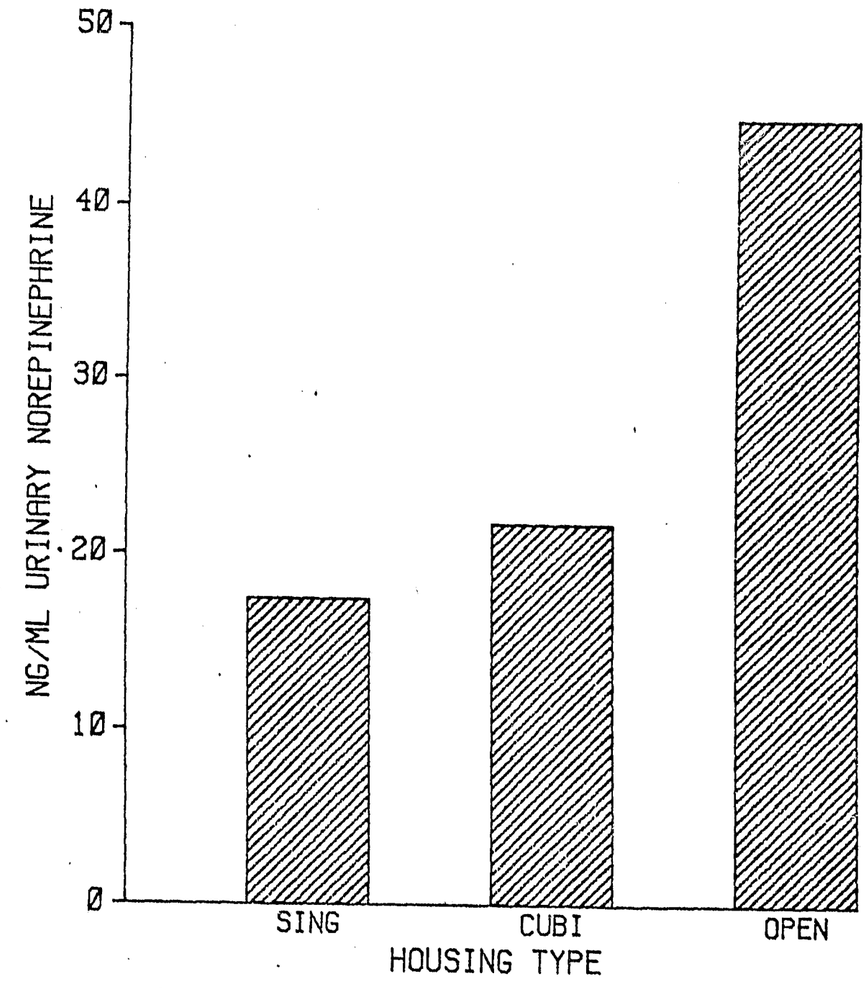


Figure 9. Urinary norepinephrine as a function of housing.

PHYSICIAN NOTED COMPLAINTS

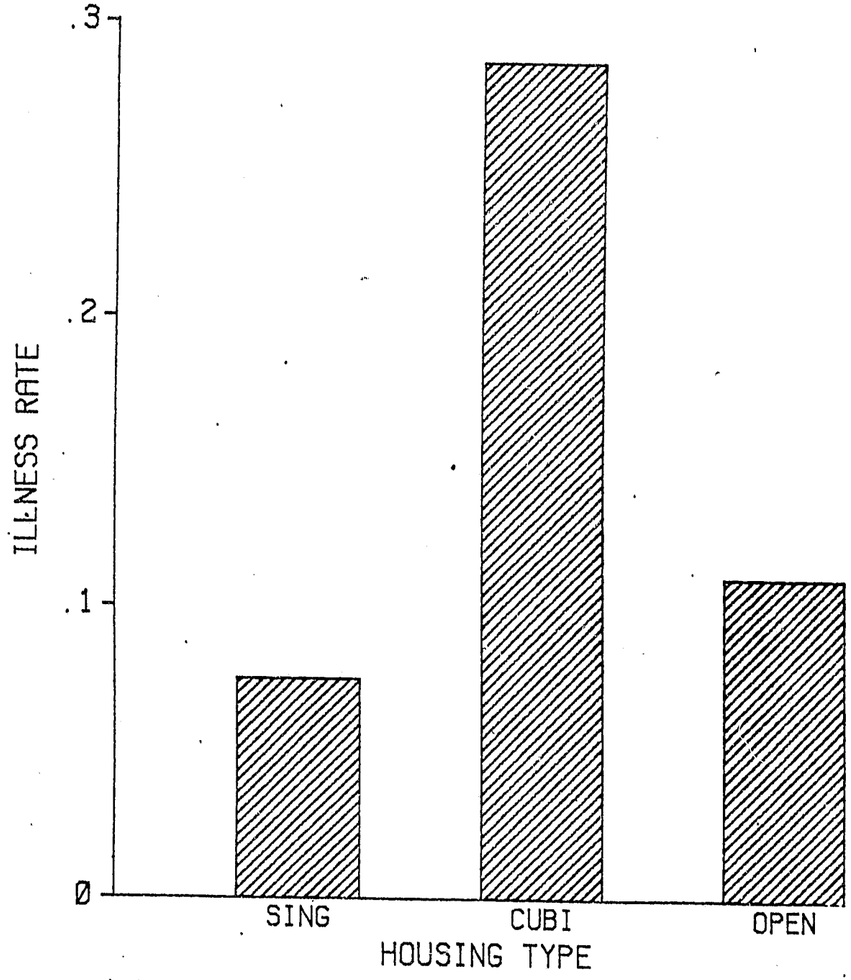


Figure 10. Illness rate as a function of housing in urine chemistry study.

MEAN LEVEL OF SOMATIC PROBLEMS

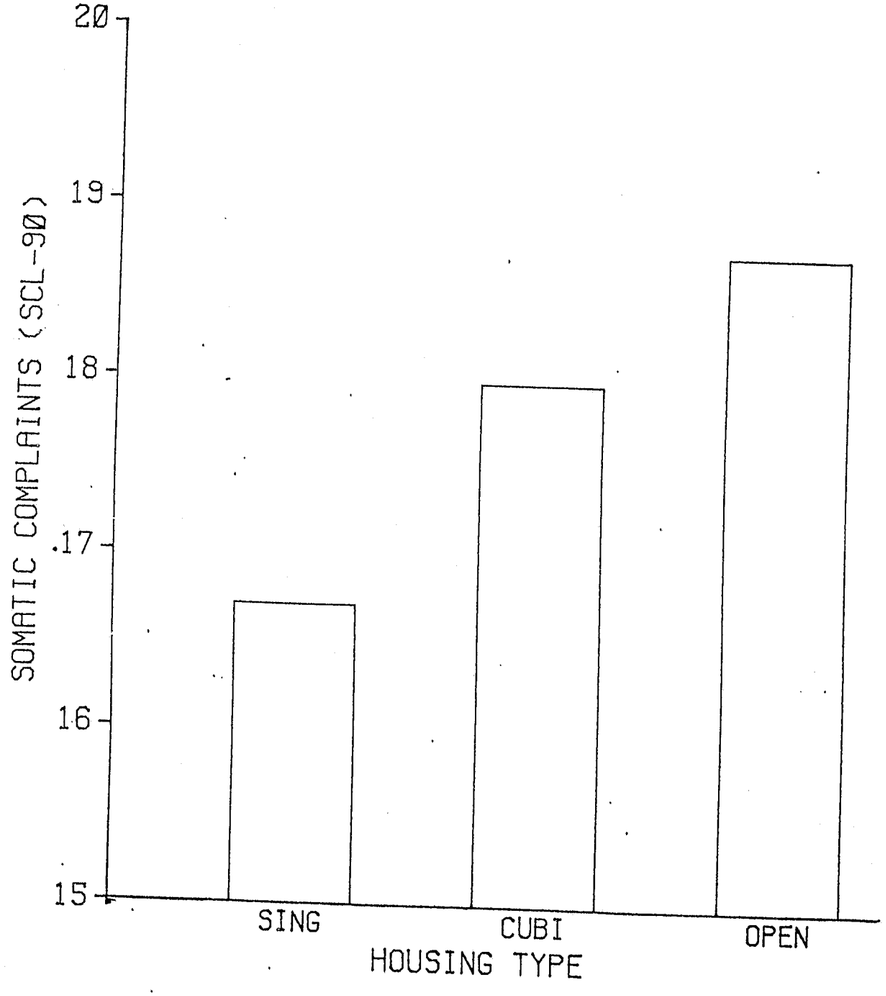


Figure 11. Reported somatic problems as a function of housing.

PHYSICIAN NOTED COMPLAINTS

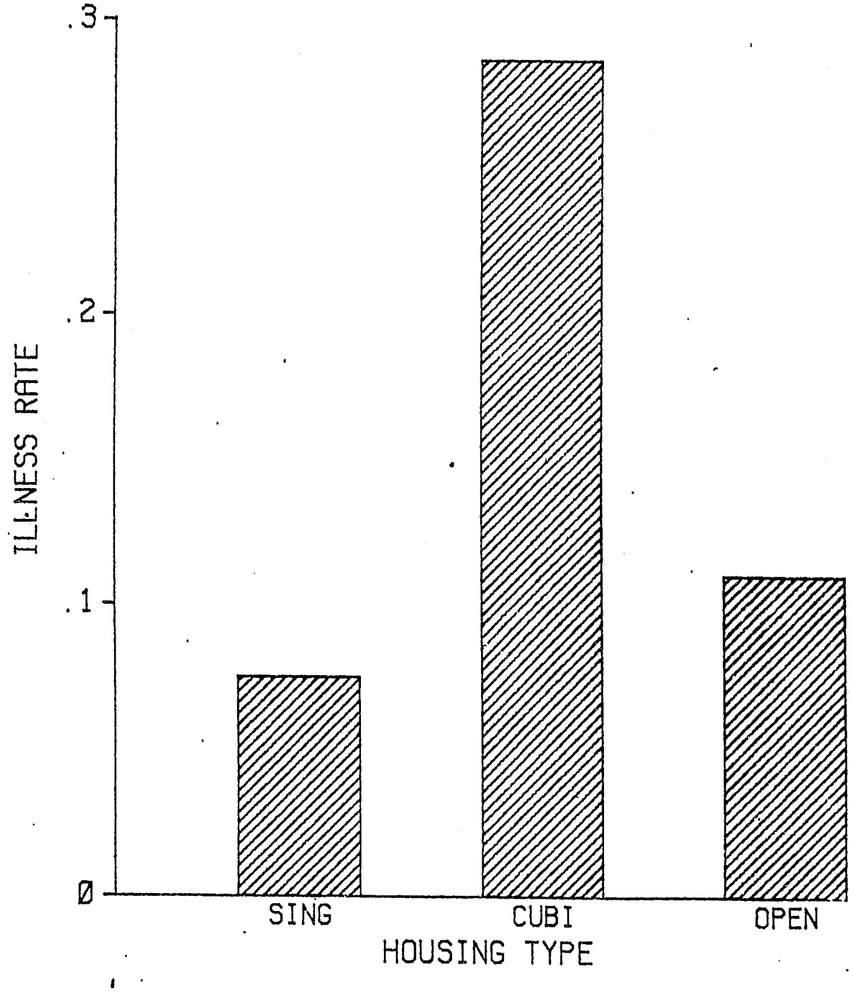


Figure 10. Illness rate as a function of housing in urine chemistry study.

MEAN LEVEL OF SOMATIC PROBLEMS

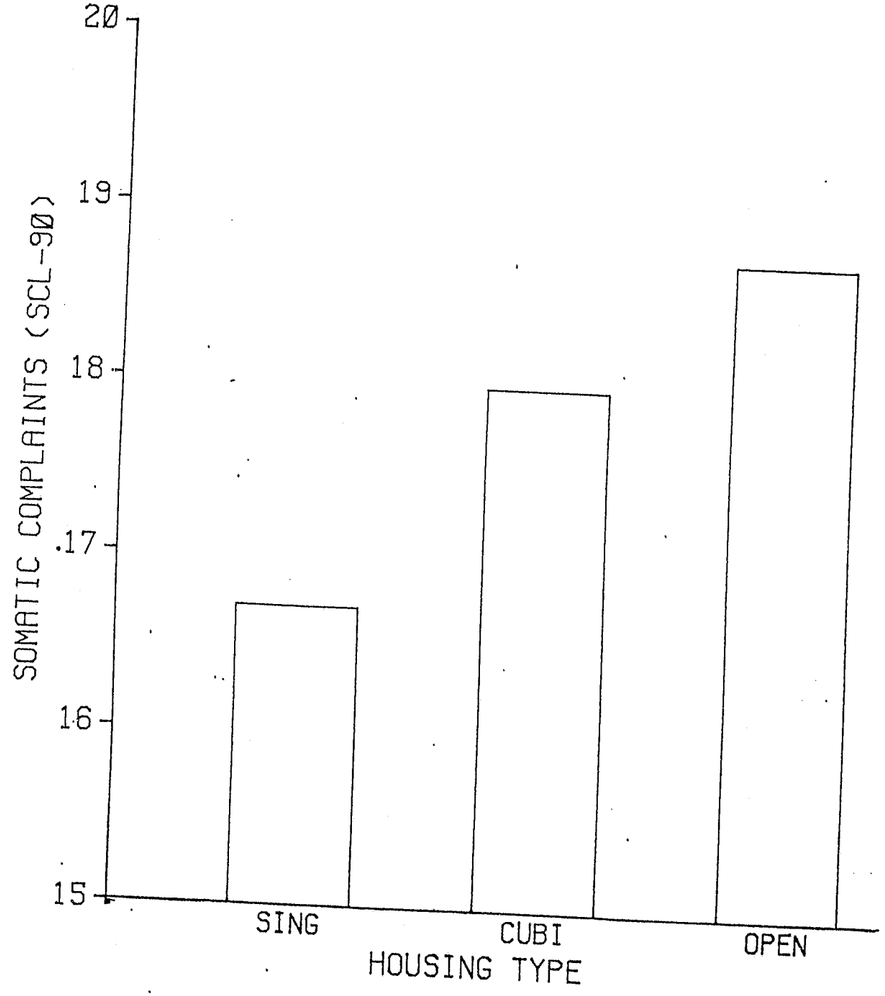


Figure 11. Reported somatic problems as a function of housing.

Table 43. Correlational Results for Urine Chemistry Study.

CORRELATION COEFFICIENTS WITH PERCEIVED CROWDING

Epinephrine	0.30**
Norepinephrine	0.31**
Total Symptoms	0.25**

CORRELATION COEFFICIENTS WITH PERCEIVED CONTROL

Perceived Crowding	-0.25**
Norepinephrine	-0.23*
Total Symptoms	-0.37**
Illness Ratio	-0.24*

* $p < .05$
** $p < .01$

factors on this relationship. An underlying assumption guiding our analyses is that background factors influence the extent to which individuals can tolerate crowded conditions. Experiences that breed tolerance should presumably be related to lower levels of stress in crowded conditions. It would be of interest, however, to examine more precisely the role of tolerance in mediating reactions to crowded housing. To what extent do background factors influence tolerance of crowding? Does tolerance for crowding actually influence the extent to which crowded conditions elicit negative psychological and health related reactions? Such a perspective is consistent with the major theory in the psychological stress literature - the coping and appraisal model of Lazarus (Lazarus, 1966; Lazarus & Cohen, 1977). This model holds that the degree of stress experienced in a particular environment depends on the individual's appraisal of this environment. Appraisal involves an assessment of the extent to which the individual finds the situation to be personally threatening. This appraisal presumably is influenced by the individual's evaluation of his ability to cope in such an environment and the degree to which the individual feels he has control over the environment. This evaluation should be affected by past experiences and individual difference factors. The measures of crowding tolerance employed in this research project may be seen as reflecting the outcome of the individual's appraisal process. If the individual feels he can cope with a particular environment, he should express a high degree of tolerance for it. Consequently, feelings of inability to cope should be reflected in low tolerance scores. On the basis of the above line of reasoning, it was predicted that the tolerance measures would be strongly related to negative reactions to crowded housing.

Tolerance for Dormitory Crowding. Tolerance for domitory crowding was assessed by having inmates indicate how many residents they could tolerate in a dormitory without it being too crowded (Appendix A). This measure appears to strongly

differentiate reactions to dormitory housing but not to singles and doubles. Higher tolerance is associated with more favorable housing rating, fewer crowding complaints, lower perceived crowding and more positive feelings on the tense/stimulated scales. Educational activities were also higher for tolerant inmates in both doubles and dorms. Interestingly, high systolic blood pressure was associated with higher tolerance in singles and doubles, but low blood pressure was slightly related to low tolerance in dormitories. There was also a trend for illness complaints to be lower with higher tolerance in dormitories ($p < .06$) (Table 44). It should be noted that mean tolerance ranges from 8 to 13 in the three housing conditions. The dormitories in the tolerance test were drawn to the scale of dormitories which held from 26 to 40 inmates in one prison. It can also be seen in Table 44 that higher tolerance dorm inmates in dorms were of somewhat younger and of lower educational and socioeconomic status. This may explain their great involvement in educational activities.

Ideal Number of Inmates

Using the same task employed to determine tolerance, inmates were asked to indicate the ideal number of inmates in these dormitories. The results on this were highly correlated with the tolerance one. Consequently, the results are quite similar to that of the tolerance measure, with more favorable reactions and less stress related responses in dorms for those who had high ideal scores. However, in contrast to the tolerance measure, ideal scores did differentiate somewhat among residents of doubles. Residents with higher ideal scores had fewer crowding complaints and fewer problems with sleeping. As with tolerance scores, high ideal inmates in dorms were younger and had a lower educational level. They were also shorter, had been longer in the dorms and had a less extensive prior incarceration history (Table 45).

People versus Space

All inmates were asked whether they were bothered more by having too many

Table 44

Results for tolerance scores

Variables	Singles ≤10, ≥12	Doubles ≤8, ≥9	Dorms ≤12, ≥13
Systolic Blood Pressure	117.19, 126.94 $F(1,40)=8.34(.01)$	114.14, 126.00 $F(1,33)=8.91(.005)$	122.0, 117.0 $F(1,78)=3.2(.08)$
Perceived Crowding			3.16, 2.39 $F(1,81)=9.39(.01)$
Educational Activities		.29, 1.9 $F(1,32)=4.68(.05)$	1.24, 2.30 $F(1,83)=3.68(.05)$
Crowding Complaints			1.51, .95 $F(1,61)=5.11(.03)$
Tense/ Stimulated			6.58, 9.00 $F(1,78)=11.24(.001)$
Room Rating			13.21, 20.59 $F(1,74)=11.68(.001)$
Total Illness Rate			.27, .13 $F(1,71)=3.70(.06)$
Hometown Size as Child	1.23, 1.67 $F(1,38)=9.24(.01)$		
Parents High School			.53, .28 $F(1,57)=5.86(.02)$
Age			32.01, 28.64 $F(1,78)=4.00(.05)$
Last Grade			9.63, 7.91 $F(1,57)=5.86(.02)$

Table 45

Results for ideal scores

Variables	Singles <4,>5	Doubles <1,>2	Dorms <10,>11
Systolic Blood Pressure			122.59, 116.19 F(1,64)=3.60(.07)
Perceived Crowding			3.26, 2.42 F(1,66)=9.87(.01)
Sleep		.89, .84 F(1,30)=5.86(.05)	
Headache Problems	.50, .90 F(1,40)=9.18(.01)		
Crowding Complaints		1.38, .77 F(1,32)=4.99(.05)	
Tense/ Stimulated			6.66, 8.68 F(1,64)=6.88(.02)
Perceived Choice			4.12, 5.47 F(1,64)=6.90(.01)
Room Rating			12.7, 20.3 F(1.60)=9.37(.01)
Total Illness Rate			.30, .13 F(1,59)=4.36(.03)
Height			69.24, 67.55 F(1,81)=6.11(.02)
Duration of Priors			84.8, 38.5 F(1,74)=4.90(.05)
Last Grade			9.70, 7.72 F(1,57)=7.79(.01)
Weeks in Prison	51.96, 33.48 F(1,35)=6.79(.02)		
Weeks in Housing			18.86, 30.29 F(1,80)=5.83(.02)
Age			32.45, 28.02 F(1,78)=7.16(.01)

people or by having too little space in their living unit. This measure was designed to assess differential sensitivity to having to deal with people or having inadequate space. Interestingly, the people/space measure seems to be related even more clearly than the tolerance and ideal measures to differential reactions to dormitories. In dormitories, inmates who are bothered more by people feel more crowded, evaluate their housing more negatively, have more negative mood states and lower feelings of choice than space bothered inmates. People-bothered inmates in dorms are also less likely to be involved in religious activities than space-bothered inmates. In light of the strong findings with dormitories, it is again of interest that no effects were obtained for singles and doubles (Table 46).

Summary of Crowding Tolerance

The tolerance, ideal, and people/space measures of crowding tolerance all provide generally consistent results. Scores on these measures strongly differentiate reactions to dormitories but are related to only a few differential reactions to singles and doubles. One might question whether knowledge of tolerance gives one any additional predictive power beyond what one has simply assessing perceived crowding. When one controls for perceived crowding by analysis of covariance, some of the results are only marginally significant. However, only the effect on illness disappears completely. It may be noted that no multivariate analyses were done for the three preceding tolerance measures. The number of inmates in the sample was simply too small to do an adequate analysis. However, analyses for the two measures for which the largest sample was available (perceived crowding and room rating) indicated that the influence of the tolerance measure remains even after controlling for the other predictor variables (socioeconomic, criminal, and time related) (Table 47).

Housing Preference Test

Table 46

Results For the People vs. Space Question (too many people or too little space)

Variables	Singles people, space	Doubles people, space	Dorms people, space
Perceived Crowding			3.2, 2.7 F(1,135)=7.40(.01)
Religious Activities			.64, 1,41 F(1,134)=7.31(.01)
Mood			18.63, 21.65 F(1,132)=5.32(.05)
Tense/Stimulated			7.0, 8.85 F(1,131)=11.07(.001)
Perceived Choice			3.88, 4,52 F(1,134)=4.48(.05)
Room Rating			13.05, 18.26 F(1,128)=11.97(.001)
SAT Score	59.75, 75.84 F(1,55)=4.52(.05)		
Beta IQ	101.88, 110.76 F(1,55)=6.34(.02)		

Table 47

Contribution of Tolerance in Multiple Regression Analyses for Dorms (for perceived crowding and room rating only)

Criterion Variable	Beta	Significance	R^2 for all Variables	N
Perceived Crowding	.27	.01	.25	100
Room Rating	-.31	.002	.31	100

The results for the 23 items of the housing preference tests are shown in Table 48. This test was designed to allow a more fine-grained analysis of crowding tolerance. The three measures of tolerance discussed so far have focused primarily on general tolerance for people in housing. Even though the phrasing of the people/space question suggests it is tapping two dimensions, the question is basically one-dimensional. In the housing preference test we tried to construct alternatives that would indicate the extent to which individuals were sensitive to number of dorm residents, amount of space and living in a double. A factor analysis was employed to determine whether the items indeed formed definable subgroups. This analysis suggested the existence of four such groups (Table 48). The strongest factor (Factor 1) seems to reflect a general degree of preference for housing which involves living with more people but having more space relative to doubles with 40 sq. ft. (space/people preference). That is, these items measure the extent to which individuals are willing to live with a larger number of inmates in order to achieve more space. The other factors reflect this same concern in slightly different ways. The second factor indicates primarily the extent to which individuals prefer more spacious dormitories of 8-20 inmates to doubles (space/dorm preference). The third factor reflects inmates choosing between fairly spacious doubles (60-80 sq. ft.) and housing units holding 6-20 inmates with the same or only 20 sq. ft./person additional space. Choosing the more socially dense housing on these items would be indicative of a preference for living with larger numbers of others (social preference). The final factor (Factor 4) reflects the degree to which inmates prefer singles to doubles with similar or more space (single preference).

A number of points should be raised about this factor analysis. The eigenvalue of Factor 4 is below 1, and this would typically suggest its exclusion from further consideration. However, since this factor represents a very distinct set of choices which were of a priori interest, this factor was

Table 48

Results for Housing Preference Test

	Choice		Preference		Factor
	A	B	A	B	
1.	2-80	20-80	520	25	2, 3
2.	2-60	20-80	498	46	2, 3
3.	2-40	20-80	436	109	1, 2
4.	2-80	6-80	502	43	3
5.	2-60	6-80	416	129	1
6.	2-40	6-80	326	219	
7.	6-80	20-80	532	13	3
8.	6-60	20-80	520	25	3
9.	6-40	20-80	417	128	1
10.	2-40	4-80	372	172	1
11.	2-40	6-80	335	209	1
12.	2-40	8-80	411	134	1, 2
13.	2-40	20-80	450	90	
14.	2-40	4-60	409	136	1, 2
15.	2-40	6-60	353	192	1
16.	2-40	8-60	441	104	1, 2
17.	2-40	20-60	472	73	1, 2
18.	1-40	2-80	292	253	1, 4
19.	1-40	2-60	360	185	1, 4
20.	1-40	2-40	447	98	4
21.	2-40 (single bunk)	2-40 (double bunk)	318	226	
22.	6-40 (single bunk)	6-40 (double bunk)	422	123	
23.	20-40 (single bunk)	20-40 (double bunk)	312	233	

Table 48 (continued)

Eigenvalue		Label
Factor 1	6.74	Space/People Preference (More people/more space)
Factor 2	1.78	Space/Dorm Preference (Dorms of 8 or 20, more space)
Factor 3	1.01	Social Preference (More people; similar space)
Factor 4	.64	Single Preference (Versus doubles with similar or more space)

Note: Items 6 and 13 were not employed in the factor analysis because they are redundant with other items.

included in further analyses. The obtained factor structure appears to reflect in part the degree of difficulty of the set of choices, with Factor 3 reflecting the easiest and Factor 4 the most difficult choices. If this degree of difficulty of the choosing of more socially dense housing over doubles is an important factor in determining the predictive value of the item sets, then the items should be ordered as follows in terms of their predictive value - Factor 3 (social preference), Factor 2 (space/dorm preference), Factor 1 (space/people preference), Factor 4 (single preference). The above rank order presumes that for sets of items on which relatively few inmates endorse more socially dense housing, the choice of higher social density reflects more strongly tolerance of high levels of social density. Such greater tolerance should be accompanied by a lower level of stress-related reactions to crowded housing. To facilitate the examination of the difficulty factor, we will evaluate the item sets in order of their presumed predictive value.

It is also presumed that the set of items indicated by the four factors may differentially predict reaction to different types of housing. Single preference might best predict reaction to singles and social preference reaction to dorms. The space/people and space/dorm items may indicate sensitivity to both space and people and hence may be related to reactions to both dorms (low space and many people) and doubles(low space).

The housing preference test was used throughout most of the project, so multivariate analyses are feasible for overall analyses and will be used in conjunction with univariate ones.

Social Preference (Factor 3)

These items involved assessment of degree of preference for doubles when both the doubles and the more socially dense alternative housing were relatively spacious. Multiple regression analyses, including all three types of housing, in which the other predictor variables and the housing type variables were

entered first, revealed that social preference did have some added predictive power (Table 49). Individuals with high preference for low social density rated their room more negatively, had a more negative mood state, had more crowding complaints and lower feelings of choice than other inmates.

Univariate analyses indicated that degree of social preference predicted reaction primarily to dormitories. For dormitory residents, a high degree of preference for doubles was related to higher feelings of crowding, a negative room rating and mood state, more crowding complaints, lower feelings of choice and lower tolerance and ideal scores (Table 50). Interestingly, no background variables appeared to strongly differentiate social preference in dorm inmates.

Space/Dormitory Preference (Factor 2)

These items assessed degree of preference for doubles relative to more spacious dormitory accommodations (8 or 20 inmates). Multivariate analyses again indicated that greater preference for doubles was associated with negative reactions to housing and negative mood state (Table 49). Univariate analyses indicated that a greater preference for doubles relative to the dorms was associated with positive reactions to singles and higher illness, a lower level of activities and a lower ideal score in dormitories (see Table 51). In addition, residents of doubles with high preference for this housing relative to dorms had higher diastolic blood pressures and reported less talking with others. Again, high preference inmates in singles are characterized by lower academic achievement and a more severe criminal history.

Space/People Preference (Factor 1)

This preference was tapped by a set of items that contrasted primarily doubles with 40 sq. ft. per person with housing holding six or more inmates with more space (60 or 80 sq. ft. per person). Multivariate analyses indicated that high preference for doubles in this set of items was related to negative room rating and mood state (Table 49). The univariate analysis indicated effects

Table 49

Influence of housing preference in multiple regression analyses

Criterion Variable	Beta	Significance Variables	R^2 for all	N
Social Preference				
Room Rating	-.09	.05	.27	482
Mood	-.35	.001	.25	174
Crowding Complaints	.15	.05	.16	174
Choice	-.25	.001	.19	174
Space/Dorm Preference				
Room Rating	-.12	.01	.28	482
Mood	-.26	.001	.19	174
Crowding Complaints	.16	.05	.16	174
Space/People Preference				
Room Rating	-.12	.01	.28	482
Mood	-.20	.01	.16	174
Single Preference				
Room Rating	-.13	.01	.28	482

Table 50

Results for Social Preference

Variables	Singles ≤4,≥5	Doubles ≤4,≥5	Dorms ≤4,≥5
Perceived Crowding			2.6, 3.2 F(1,206)=10.92(.002)
Religious Activities			1.3, .8 F(1,205)=4.11(.05)
Club Activities		1.00, .39 F(1,110)=5.03(.05)	
Talking	2.9, 2.5 F(1,219)=4.11(.05)		
Tolerance Score			13.9, 11.6 F(1,81)=4.59(.05)
Ideal Score			19.7, 11.3 F(1,81)=6.3(.02)
Crowding Complaints			.36, .86 F(1,207)=8.71(.005)
Mood	30.2, 23.9 F(1,112)=6.65(.02)		25.04, 19.27 F(1,144)=11.19(.001)
Perceived Choice			4.92, 4.05 F(1,143)=4.59(.05)
Room Rating			17.7, 13.5 F(1,182)=7.36(.01)
Parents High School		.20, .50 F(1,103)=4.79(.05)	
Custody		1.67, 2.36 F(1,104)=5.77(.02)	
Weeks in Housing		27.0, 19.6 F(1,204)=4.49(.05)	

Table 51

Results for Space/Dorm Preference

Variables	Singles ≤7,≥8	Doubles ≤7,≥8	Dorms ≤7,≥8
Perceived Crowding	2.00, 1.6 F(1,217)=12.92(.001)		
Room Rating	22.05, 25.41 F(1,216)=5.47(.02)		
Diastolic Blood Pressure		56.42, 63.30 F(1,160)=8.43(.01)	
Talking		2.77, 2.38 F(1,110)=4.04(.05)	
Religious Activities			1.20,.62 F(1,205)=8.10(.01)
Educational Activities			1.88, 1.16 F(1,205)=5.21(.05)
Ideal Score			16.47, 10.55 F(1,81)=5.02(.05)
Illness Rate (>6 weeks)			.20, .30 F(1,119)=3.50(.06)
Last Grade in School	11.12, 10.19 F(1,185)=7.71(.01)		
SAT Scores	86.40, 71.10 F(1,113)=10.92(.01)		
Prior Confinements	1.27, 2.72 F(1,202)=13.56(.001)		
Duration of Prior Confinements	80.81, 142.60 F(1,205)=6.54(.02)		

only for doubles or singles. Those with a high preference for doubles in this set of items rated singles as less crowded and more favorably on the room rating scale. Residents of doubles with a high preference for this type of housing had lower illness rates (Table 52). Thus, those who strongly prefer low social density housing (e.g., doubles), even at the expense of reduced spaciousness, show a positive evaluation of singles and lowered illness rates in doubles. It is also of interest to note some of the characteristics that differentiate low and high spatial preference scorers. For instance, high scorers (relatively stronger preference for doubles) tend to have lower academic achievement and a more severe criminal history.

Single Preference (Factor 4)

Three items assessed the degree to which an inmate preferred singles over doubles with similar or greater space per person. Multivariate analyses revealed only that residents with a stronger preference for singles rated their housing negatively (Table 49). Univariate analyses indicated that single preference predicted a few reactions to singles and dorms. Among the singles residents, those with a strong preference for singles rated them as less crowded and generally more positive on the room rating scale. A strong preference for singles was also related to less reported talking. As for the dorm residents, high single preference was related to a lower tolerance score and a less favorable room rating (Table 53). Thus, single preference items do seem to tap degree of favorability toward single cell and dormitory housing, with high single preference being related to positive reactions in singles and negative ones in dorms. It should also be noted that for single residents, strong single preference is associated with being older, having completed less high school and a greater confinement history.

Conclusions from Housing Test

The clearest results from the housing preference test are for the social

Table 52

Results for Space/People Preference

Variables	Singles <9,>10	Doubles <9,>10	Dorms <9,>10
Perceived Crowding	2.04, 1.53 F(1,217)=17.96(.001)		
Room Rating	21.83, 25.61 F(1,216)=7.09(.01)		
Total Illness Rate		.22, .11 F(1,103)=4.85(.05)	
Last Grade in School	11.24, 10.12 F(1,185)=11.32(.001)		10.44, 9.38 F(1,161)=5.32(.05)
SAT Scores	87.00, 70.45 F(1,113)=13.08(.001)		85.10, 74.57 F(1,103)=4.25(.05)
Prior Commitments	1.32, 2.72 F(1,202)=7.18(.001)		
Hometown Size as Child		1.40, 1.59 F(1,109)=4.07(.05)	
Beta IQ Scores		109.72, 103.05 F(1,80)=4.73(.05)	
Height			69.74,68.86 F(1,206)=3.94(.05)

Table 53

Results for Single Preference

Variables	Singles ≤2, ≥3	Doubles ≤2, ≥3	Dorms ≤1, ≥2
Perceived Crowding	1.9, 1.6 F(1,218)=8.28(.005)		
Talking	2.7, 2.4 F(1,220)=5.97(.02)		
Tolerance			13.53, 11.10 F(1,81)=9.17(.005)
Room Rating	22.46, 25.73 F(1,217)=5.68(.02)		13.26, 15.7 F(1,182)=3.94(.05)
Age	32.6, 36.6 F(1,214)=10.36(.002)		31.6, 34.4 F(1,196)=4.52(.05)
Grade in School	10.99, 10.16 F(1,186)=6.59(.02)		10.34, 9.16 F(1,161)=6.30(.01)
Prior Confinements	1.6, 2.7 F(1,203)=7.39(.01)		
Months Left to Serve	16.8, 25.5 F(1,215)=7.78(.01)		
Duration of Priors	95.5, 144.2 F(1,206)=4.22(.05)		
Hometown		1.39, 1.63 F(1,109)=6.39(.01)	
Weeks in Housing		24.01, 16.58 F(1.61)=4.25(.05)	

preference items. These seem to show differential reactions to dormitory housing, much as the tolerance, ideal and people/space measures. The results from the other preference types are not as strong but do indicate that reactions to singles are associated with preference for low social density, even at the expense of amount of space. Psychological reactions to doubles were not related to any of the preference measures.

The differences in predictive power of the preference measures for different types of housing suggest that they indeed may be tapping differential sensitivity to various housing types. The social preference items seem to tap sensitivity to large numbers of others in dorms. The other preference measures involve both spatial and social factors and seem to tap sensitivity to single-cell housing. The predictive power of social preference items may also be related to the difficulty factor discussed earlier since these items result in relatively low frequency of endorsement of the high social density alternative. Thus someone who has a high score for this set of items is obviously one who prefers high social density.

To provide an overall perspective of the relation of the various predictor variables and the housing variables with these different preference types, a multivariate analysis was employed for each preference type in which all these variables were entered simultaneously (Table 54). The main finding was that greater duration or prior confinement and shorter time in prison were related to greater preference for low social density.

Influence of Perceived Crowding, Room Rating, Control and Choice

A number of theoretical perspectives predict that negative effects of stress or crowding will be mediated by negative emotional reactions to the environment. For example, Stokols (1972) has proposed that psychological feelings of being crowded are necessary for negative effects of crowded conditions to obtain. Feelings of control have also been emphasized in a number of theoretical models

Table 54

Multiple regression of predictor variables and housing type for housing preferences (including cubicles)

Criterion Variable	Predictor Variable	Beta	Significance	N
Single Preference	Duration of Priors	.13	.03	406
	Dorms vs. Rest	.19	.001	406
Space/Dorm Preference	Weeks in Prison	-.17	.01	406
Space/People Preference	Duration of Priors	.13	.03	406
	Weeks in Prison	-.13	.05	406
Social Preference	Grade in School	.13	.03	406
	Weeks in Prison	-.13	.05	406

(e.g., Baron & Rodin, 1978).

The present study employed two scales to assess evaluation of the environment (crowding and room rating) and two scales to assess feeling of control or choice. To assess the influence of these variables independent of other predictor variables and housing type, the additional impact of each of these variables was assessed in multivariate analyses in which the predictor and housing variables were entered first. Tables 55 to 58 present the results of these analyses. It is evident that all four scales have reasonable predictive power beyond that provided by the other predictor and housing variables. It should be noted that none of the psychological variables are significantly related to illness in these analyses. Although we have discussed this issue earlier, we have implied that perceived control should be related illness rate. Some evidence for this was obtained in the analysis of the impact of length of time in housing and in the urine chemistry study. Possibly the impact of perceived control on illness will be evident only in analysis of dormitories. The urine chemistry sample consisted primarily of dormitory residents and the perceived control effect of time was found only in dormitories.

Psychological evaluation of the environment and feelings of control and choice do seem to be a significant factor in reactions to prison housing as suggested by various theories. In other words, one has to consider the subjective feelings of the inmate as well as the physical conditions in predicting overall inmate response to prison housing.

Influence of activities

Many models of crowding assume that individuals will actively attempt to adjust or cope with crowded conditions (e.g., Baron & Rodin, 1978). Thus individuals may demostrate withdrawal from social activities and increased involvement in solitary activities (e.g., Baum and Valins, 1979). We measured involvement in a number of activities to determine whether these might reflect

Table 55

Influence of Perceived Crowding in Multiple Regression Analysis for All Housing

Criterion Variables	Beta	Significance	R^2 for all Variables	N
Room Rating	-.51	.001	.45	576
Mood	-.42	.001	.25	174
Tense/ Stimulated	-.33	.001	.20	174
Crowding Complaints	.29	.001	.23	174
Other Complaints	.24	.01	.10	174
Choice	-.19	.03	.16	174
Control	-.30	.001	.15	174
Sleep	.23	.05	.24	106
Headache	.14	.02	.24	280

Table 56

Influence of Room Rating in Multiple Regression Analyses for all Housing.

Criterion Variables	Beta	Significance	R^2 for all Variables	N
Perceived Crowding	-.52	.001	.45	576
Systolic Blood Pressure	.13	.01	.07	576
Diastolic Blood Pressure	.18	.001	.14	576
Mood	.62	.001	.41	173
Tense-Stimulated	.41	.001	.24	173
Crowding Complaints	-.32	.001	.24	173
Other Complaints	-.29	.001	.13	173
Choice	.33	.001	.21	173
Control	.33	.001	.16	173
Sleep	-.32	.01	.27	103
Tolerance	.23	.05	.31	103
Headache	-.23	.001	.26	273

Table 57

Influence of perceived control in multiple regression analyses for all housing.

Criterion Variable	Beta	Significance	R^2 for all Variables	N
Perceived Crowding	-.25	.001	.14	170
Room Rating	.26	.001	.28	170
Mood	.49	.001	.12	176
Tense/ Stimulated	.16	.04	.13	176
Other Complaints	-.25	.01	.06	176
Choice	.20	.01	.12	176
Problems Sleeping	-.28	.01	.20	106
Headache	-.28	.01	.09	123

Table 58

Influence of perceived choice in multiple regression analyses for all housing.

Criterion Variable	Beta	Significance	R^2 for all Variables	N
Perceived Crowding	-.17	.03	.25	164
Room Rating	.29	.001	.26	164
Systolic Blood Pressure	.18	.03	.13	164
Mood	.30	.001	.12	166
Control	.22	.01	.08	166

inmate coping with and/or adjustment to prison living conditions. These were degree of talking with others and frequency of participation in club, educational, religious and sport activities. Club activities were assumed to be socially oriented whereas religious and educational activities were assumed to have a strong nonsocial component. Although educational and religious activities do involve social settings, interaction is generally somewhat limited. Sport activities can of course be both nonsocial and social. Sport activities may function as a useful way of reducing tension.

One indication of the role of prison activities can be derived from the various univariate analyses presented previously. A perusal of these various analyses indicates that involvement in club activities was most frequently related to background factors. Club activities were lower for individuals from large homes, with parents of lower educational and occupational levels and with longer time in present housing. Since this type of activity is the most obviously social of all of the activities assessed, these results could be interpreted as indicative of social avoidance. Social avoidance would be one way to reduce exposure to crowding. It is of interest in this light that those characteristics associated with lowered club activities were also associated with more positive reaction to dormitory living. The other activities did not show a consistent pattern in the univariate analyses, although in assessing correlations with illness it was found that sports activities were related to lower illness rates (Table 42).

Another way of assessing the impact of activities is to assess their additional contribution in multivariate analyses afer the other predictor and the housing variables have been entered into the analyses. No effects were obtained for club and educational activities. Religious activities were related to higher feelings of choice and less problems with headaches (Table 59). Sport activities were related to lower diastolic blood pressure, increased

Table 59

Influence of Religious Activities in Multiple Regression Analyses

Criterion Variables	Beta	Significance	R^2 for all Variables	N
Choice	.16	.05	.15	176
Headache	-.13	.03	.24	281

tolerance for crowding, but negative room rating (Table 60). Thus while religious and sport activities do seem to be associated with some positive reactions, club and educational activities do not have an overall impact. The influence of club activities discussed earlier was observed primarily in dormitories. However, sample size limitations made multivariate analyses for dormitory residents only not feasible.

General Summary

A large number of results and tentative conclusions have been presented. In presenting the results the focus has been on providing a detailed picture. One purpose for this was to enable a comparison of commonalities between our present findings and those of future studies along a wide variety of dimensions. However, in deriving conclusions from the analyses presented thus far, I will focus on the most consistent and stable findings and those which are most relevant theoretically.

In our previously published papers, we have highlighted the negative effects of open dorms versus other less crowded housing such as singles or doubles. Dorms are associated with negative psychological reactions and increased illness rates. In our present analyses additional negative effects on mood state and problems with headaches were demonstrated. One limitation of these findings is that they all are based on self-reports of psychological or physical state (illness complaints). Thus, it could be argued that crowded dorms elicit negative feelings and concern about one's physical health, but not real physical pathology. Several of these results emanating from this project suggest a contrary conclusion.

Detailed analyses of the illness data suggests that categories of complaints that were of a verifiable nature were significantly elevated in dorms relative to singles, while the other illness categories were not significantly different. Included among the sets of complaints that were significantly

Table 60

Influence of Sports Activities in Multiple Regression Analyses

Criterion Variables	Beta	Significance	R^2 for all Variables	N
Room Rating	-.08	.05	.26	576
Systolic Blood Pressure	-.10	.02	.06	576
Diastolic Blood Pressure	-.22	.001	.16	576
Tolerance	.21	.03	.32	106

different was one based on physicians' ratings of verifiability. These findings suggest that the illness complaint effects are based in large part on the experience of real illness symptoms.

Previous research by D'Atri and his colleagues (e.g., D'Atri et al., 1981) has found that dorms are associated with elevated blood pressures. In our own research significant elevations of blood pressure in dormitories was also apparent in regression analyses controlling for the influence of other predictor varaibles. Yet the blood pressure effects observed in this and other studies have been rather weak. More compelling evidence of a physiologically based stress was found in the studies of epinephrine and norepinephrine secretions in urine at Danbury FCI. These indices of stress were significantly elevated in dorms relative to singles and doubles.

The results for illness, blood pressure and urine chemistry thus provide a fairly strong basis for concluding that dormitory living is a significant source of stress. Our summary thus far has not addressed the exact pattern of findings for singles, doubles and dorms but has focused mostly on the negative reactions to dorms. Yet, careful inspection of the results in Table 30 and Figures 12-14 reveals an interesting pattern of results. For psychological reactions (perceived crowding, room rating, mood state and perceived control) doubles and dorms are rated in similarly negative terms. However, singles and doubles are similar in illness rate and headache problems, in contrast to the elevated incidence in dormitories. So while doubles and dorms produce similar negative reactions, only dorms elicit negative somatic reactions. The results from the Danbury urine chemistry study lead to similar conclusions. While ratings of crowding increased from singles to cubicles to dorms (Figure 7), urine chemistry indices were elevated only in dormitories (Figures 8 & 9). These results are certainly contrary to a simplistic perspective that negative effects of high density are mediated by negative crowding-related feelings (cf. Stokols, 1972).

Figure 12. Housing type and perceived crowding.

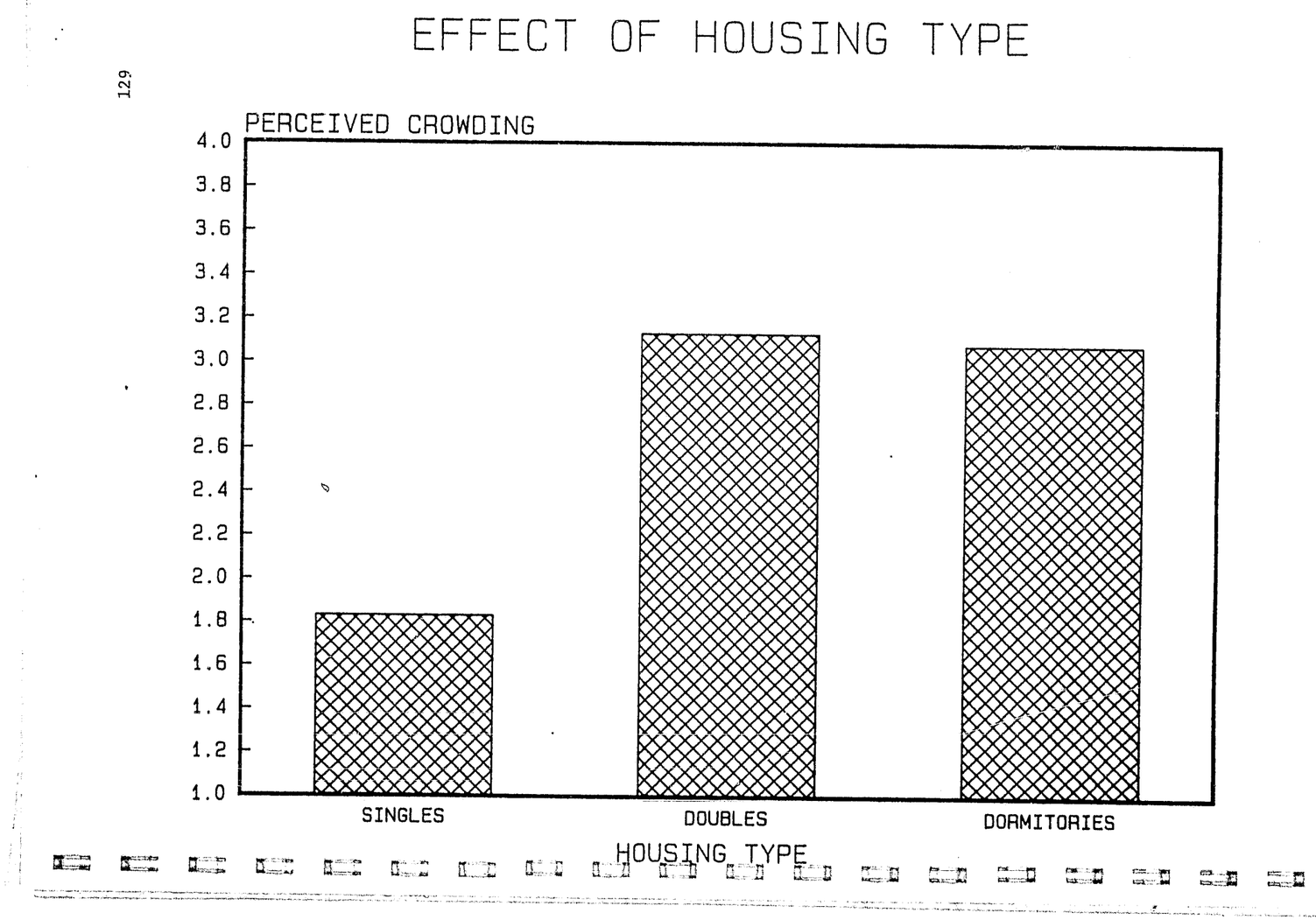


Figure 13. Housing type and illness.

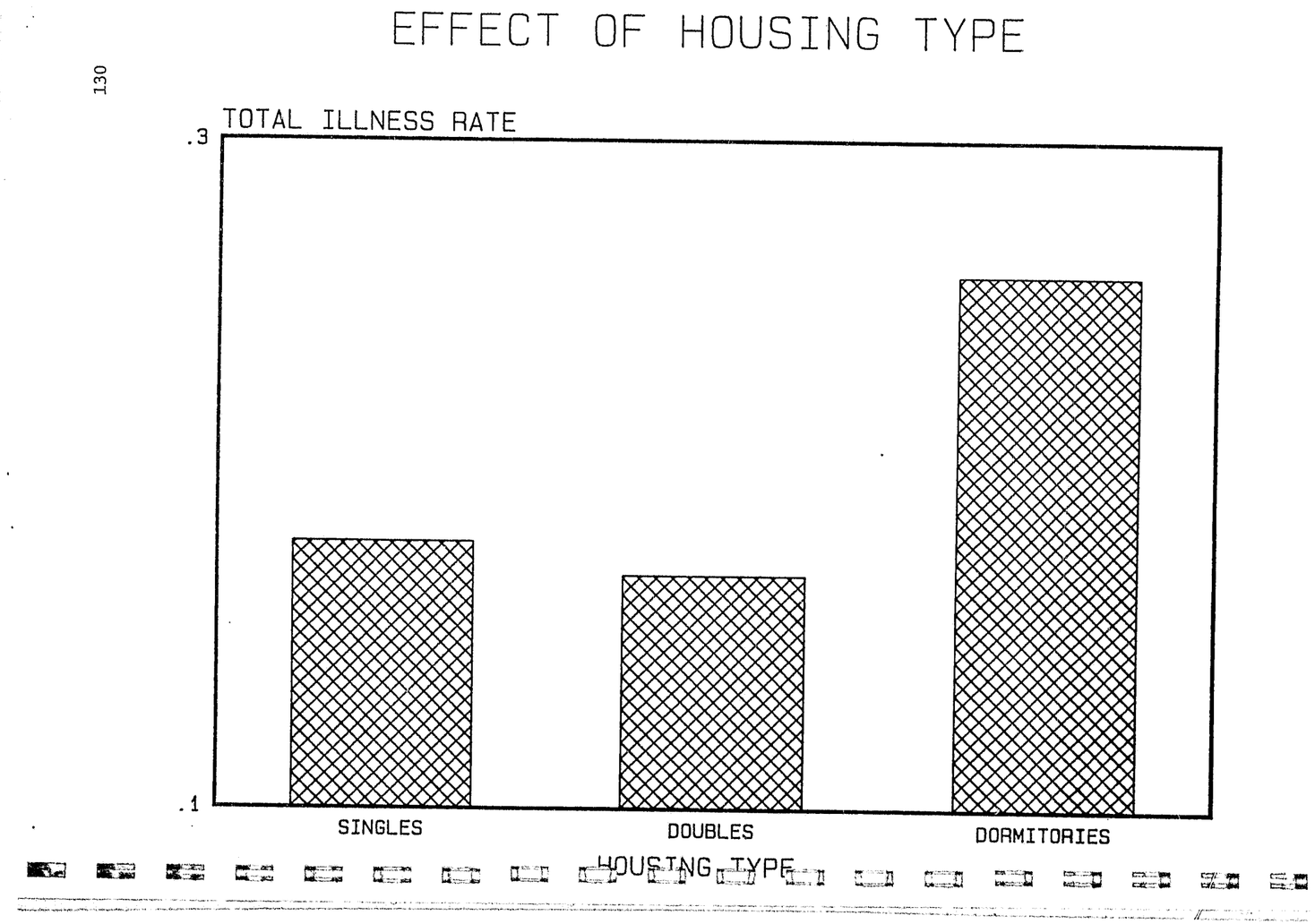
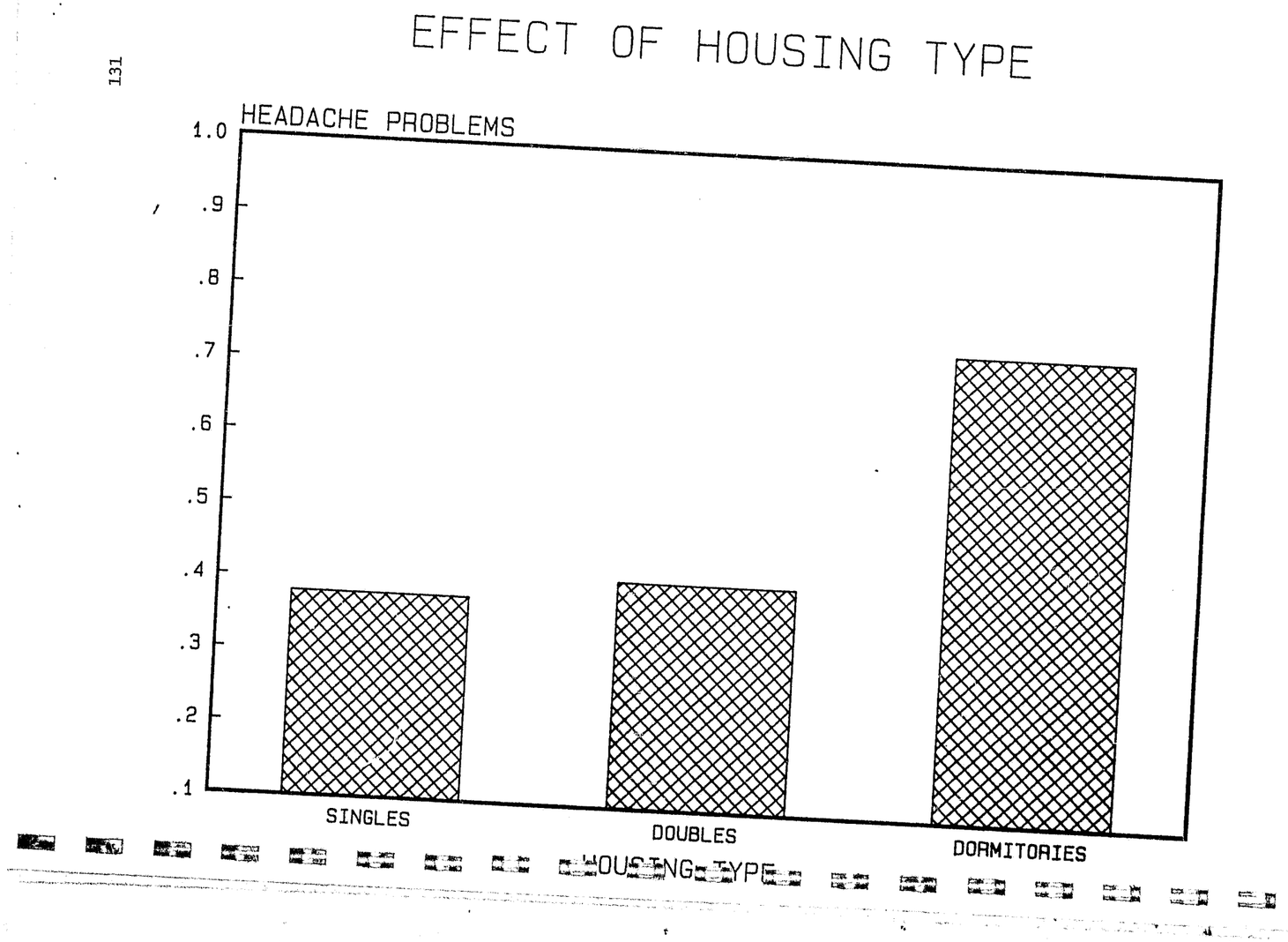


Figure 14. Housing type and headaches.



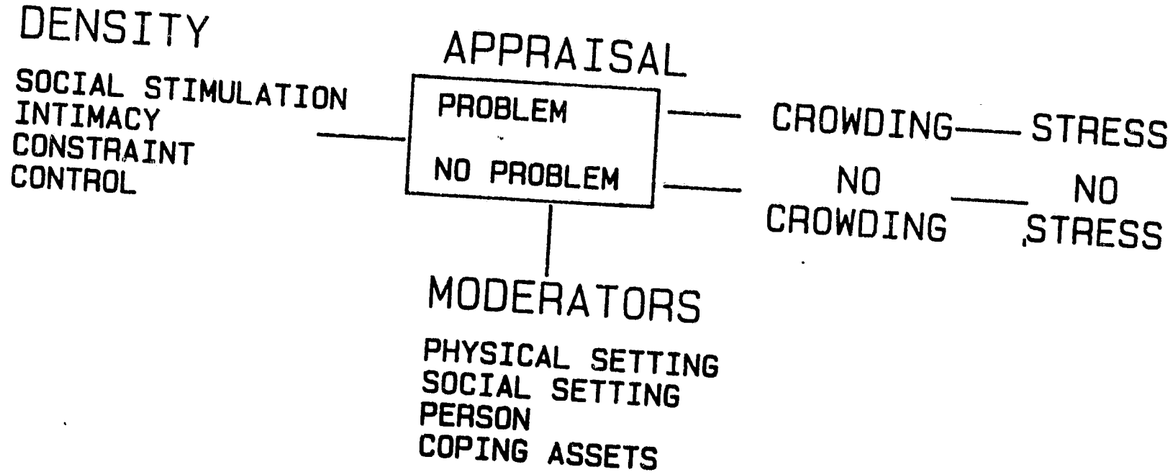
This position has wide acceptance in the field, although several scholars have taken exception to this point of view (e.g., Freedman, 1976; Paulus 1980). The social interaction-demand model (Figure 1) was designed explicitly to accommodate the possibility of lack of correspondence between psychological and behavioral/physiological reactions to crowded environments.

Further evidence for the importance of differentiating between psychological and somatic reactions comes from the analysis of the impact of time in housing. Increased time in housing unit is strongly related to reduction in illness rates, especially in dorms (Figure 2). Yet, psychological reactions (perceived crowding, room rating and mood state) do not vary significantly in any of the housing conditions (e.g., Figures 3-5). This is somewhat surprising since it would seem reasonable to expect individuals either to adapt to their living conditions and become more favorable, or in the case of dormitories, become increasingly more negative about living in crowded conditions. Reactions on one psychological scale, however, do change over time. Perceived control increases over time in housing for dorms but not singles (Figure 6) (sample size for doubles was too small for this analysis and that of mood).

In accord with the overall data on housing type, the data on time in housing suggests the need to differentiate between somatic and psychological reactions. Furthermore, it points to the potential special role of feelings of control in relation somatic reactions. It may now be useful to develop further the theoretical implications of the results summarized to this point.

Baum and Paulus (in press) have recently presented a model that integrates various approaches to crowding within a stress framework (cf. Lazarus & Cohen, 1977) (Figure 15). As indicated in Table 1, density is a potential source of social stimulation or overload, violations of personal space or privacy (intimacy), interference or constraint of behavioral options and lessened

Figure 15. General crowding-stress model.



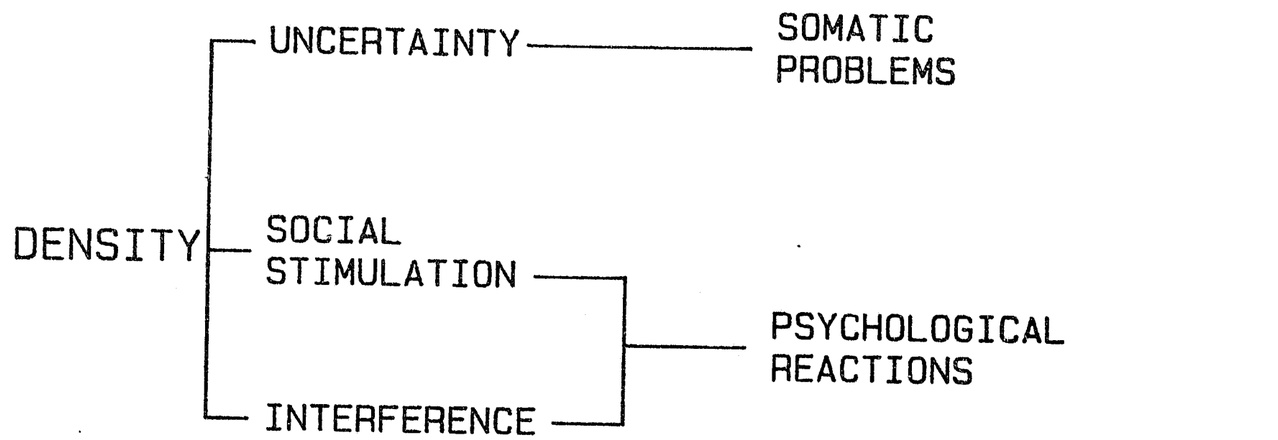
control over one's own activities and the environment. The individual presumably appraises the extent to which density represents a problem along these dimensions. This appraisal is influenced or moderated by the nature of the physical setting (e.g., availability of privacy partitions), the type of social environment (friendly or hostile; unfamiliar or familiar), the person's individual characteristics or needs and the ability of the person to cope with density related conditions. Thus, highly dense conditions may not be judged problematic in an environment where partitions are provided, familiar friends abound, and the person has had a history of successful functioning in such environments. If the dense conditions are seen as a problem or a threat to the individual, presumably he/she will express feelings of crowding and other negative psychological reactions, which in turn will lead to the experience of stress. Although this model may be appropriate for some settings, it cannot handle the discrepancy between the psychological and somatic reactions in the present study.

The social interaction-demand model (Cox et al., in press) (Figure 1) does allow for such a discrepancy, but it lacks the specificity to account satisfactorily for the obtained pattern of results. A careful analysis of the density-related problems in doubles and dorms suggests a solution. Certainly, both dorms and doubles provide for higher levels of potential interference than singles. Because of the confined space in doubles, interference may be fairly similar in both doubles and dorms. Degree of social stimulation may also be similar for both of these housing types. In dorms one is exposed to a lot of people in an open area, while in doubles one is exposed to potentially more intense contact within one's room, in addition to the casual contact in the hallways. These two relatively salient environmental conditions should not change much over time. The above analysis accounts for both the similarity in rating of doubles and dorms and lack of change in these ratings over time.

Degree of uncertainty is a more subtle variable, however. Uncertainty represents to a large degree the unpredictability and lack of familiarity with others in an environment. Although these factors are present to some degree in all prison housing, in open dormitories these factors are more likely to be a problem. In open dorms one has to deal potentially with a large number of co-residents without the control or regulatory mechanisms provided by rooms or privacy cubicles. Having one's own room or sharing it with only one person greatly reduces the extent to which one is unwillingly exposed to a whole range of unpredictable encounters with other residents. Having or sharing a room, greatly increases the extent to which one can limit unwanted interactions. Also, in the case of the insitutions we have studied, dormitories often represent the initial housing assignment for inmates. Consequently dormitories should typically have higher degrees of turnover in residents than units composed of singles or doubles. One consequence of the high turnover rate is the continual presence of a lot of strangers, a factor which should contribute to the degree of unpredictability and uncertainty experienced by the resident. Although we were not able to assess turnover explicitly in this study, we have found it to be an important factor in another study (McCain, Cox, Paulus, & Karlovac, 1981). The above reasoning suggests the tentative hypothesis that effects of dormitory crowding on somatic reactions may lie in the degree of uncertainty that characterizes this environment while the negative reactions to doubles and dorms is related to degree of social stimulation and interference (Figure 16).

The hypothesis that uncertainty is a source of somatic problems is consistent with other research showing that uncertainty or lack of control is related to physiological or health-related reactions (e.g., Mason, 1975; Folkman, 1984; Cohen, et al., 1979). This research suggests that environmental, social or personal factors that increase one's feelings of control in

Figure 16. Revised social interaction-demand model.



unpredictable and uncertain situations reduce the health-related stress reactions. In our own research, we found that providing privacy partitions reduces the illness effect in dorms (McCain et al., 1980), possibly because of the increased control afforded by these partitions. It is also interesting to note that the only psychological scale that varied over time in the present study was that of feelings of control. The changes in feelings of control mirrored those for changes in illness rate in the dormitories. Illness rate declined strongly over time in dorms, while feelings of control increased over that same period of time. Thus feelings of control over one's environment may be related to somatic reactions. In contrast, reactions to degree of stimulation and interference may be mediated by the appraisal processes, based in part on past experiences in similar environments (Figure 17).

In this paper, we have presented the results of a large number of analyses designed to assess those background or experiential factors that influence appraisal of and reactions to prison housing. The analysis of background variables revealed a number of consistencies. Higher socioeconomic and educational level were related to negative reactions to prison housing in general and to dormitories in particular (see examples in Figures 18 to 20). Possibly for these individuals, prison represents a greater level of deprivation or greater degree of contrast in quality between their prior environment and their current one. Individuals of lower socioeconomic or educational status may have learned to cope better with or to tolerate personal deprivations of the sort encountered in prison (e.g., lack of privacy, poor food, poor climate control, potential physical danger).

Three background variables that appeared to be particularly relevant for reactions to crowded housing were the number of people in the home while growing up (homesize) and the size of hometown as child or adult. These three variables affected reactions to doubles and/or dorms, but not singles. Those

Figure 17. The role of psychological control in a revised social interaction-demand model.

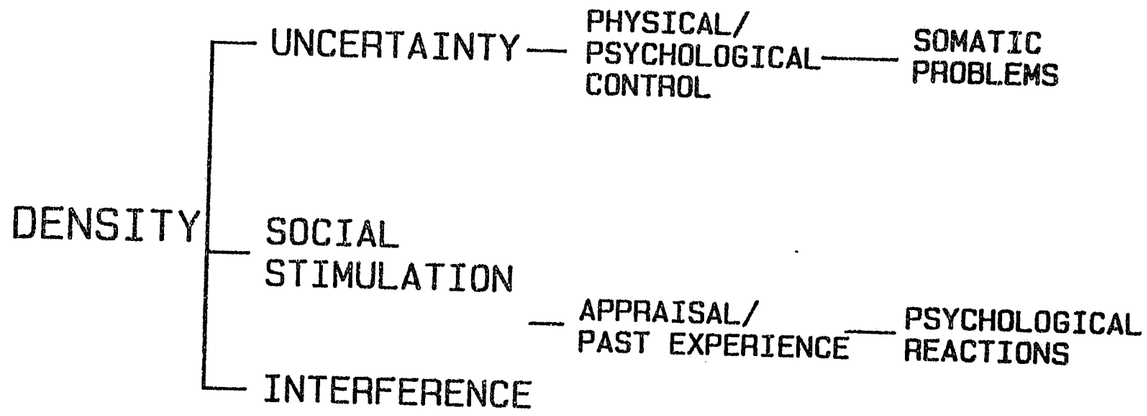


Figure 18. Background influences on perceived crowding in dorms.

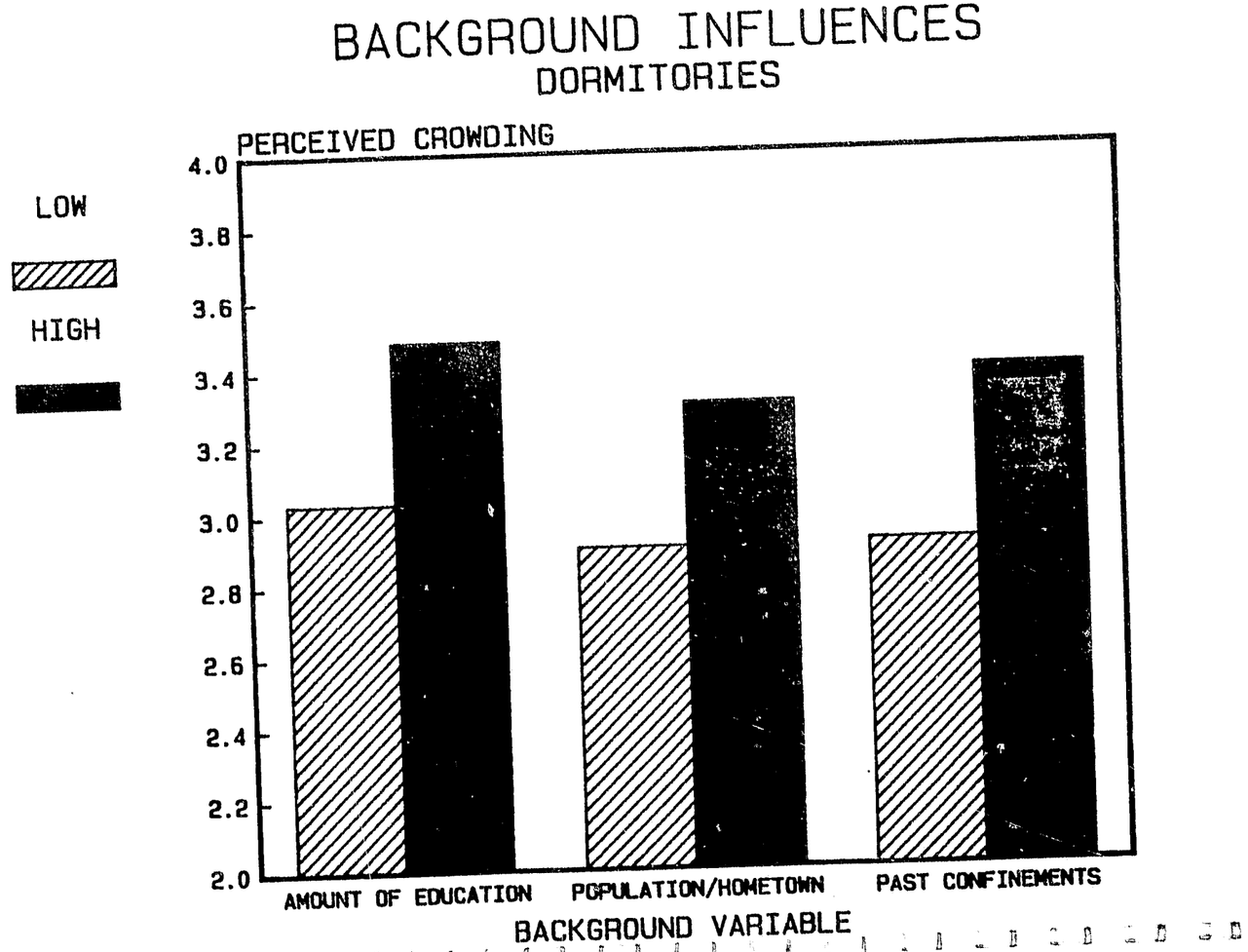


Figure 19. Background influences on room rating in dorms.

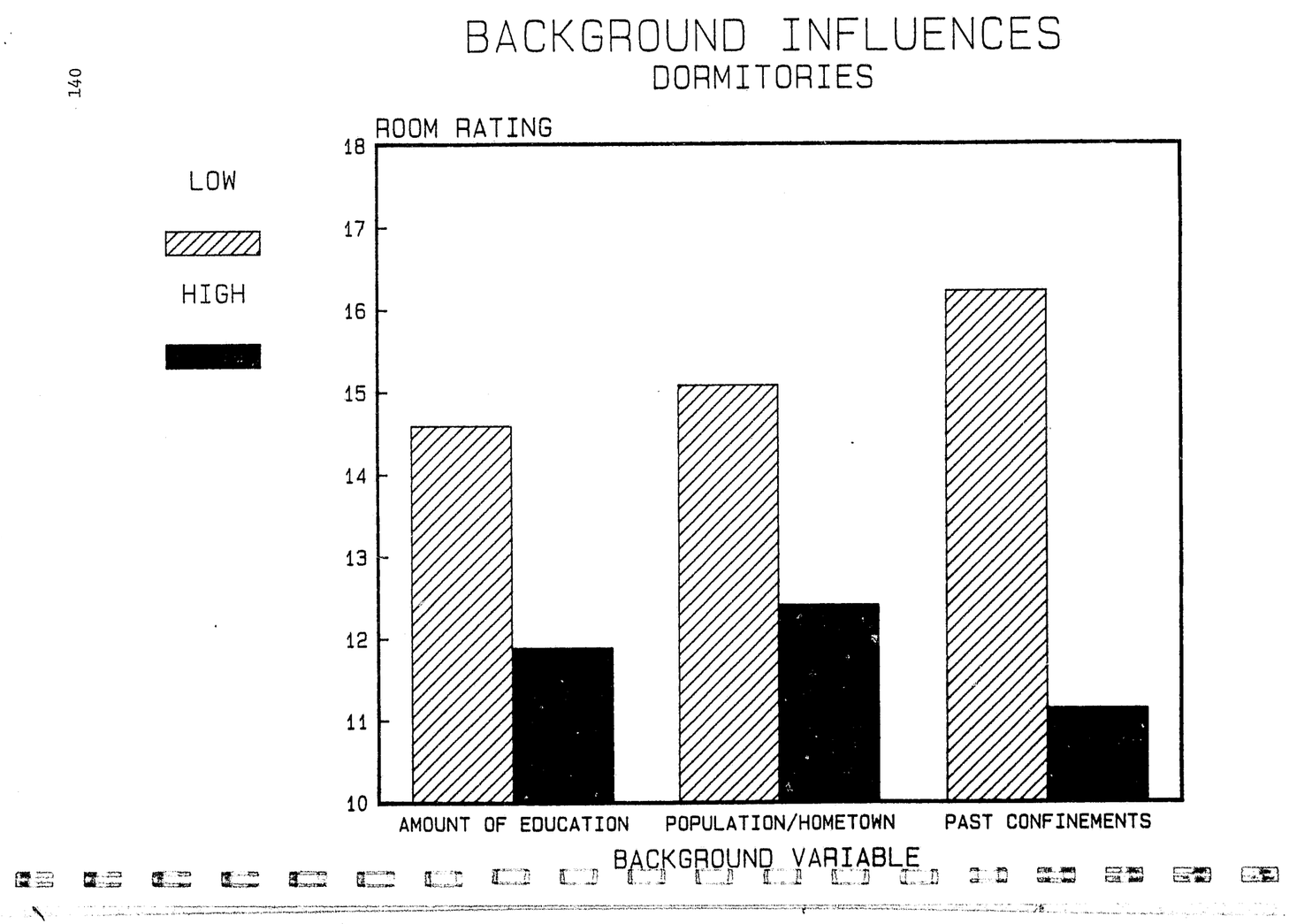
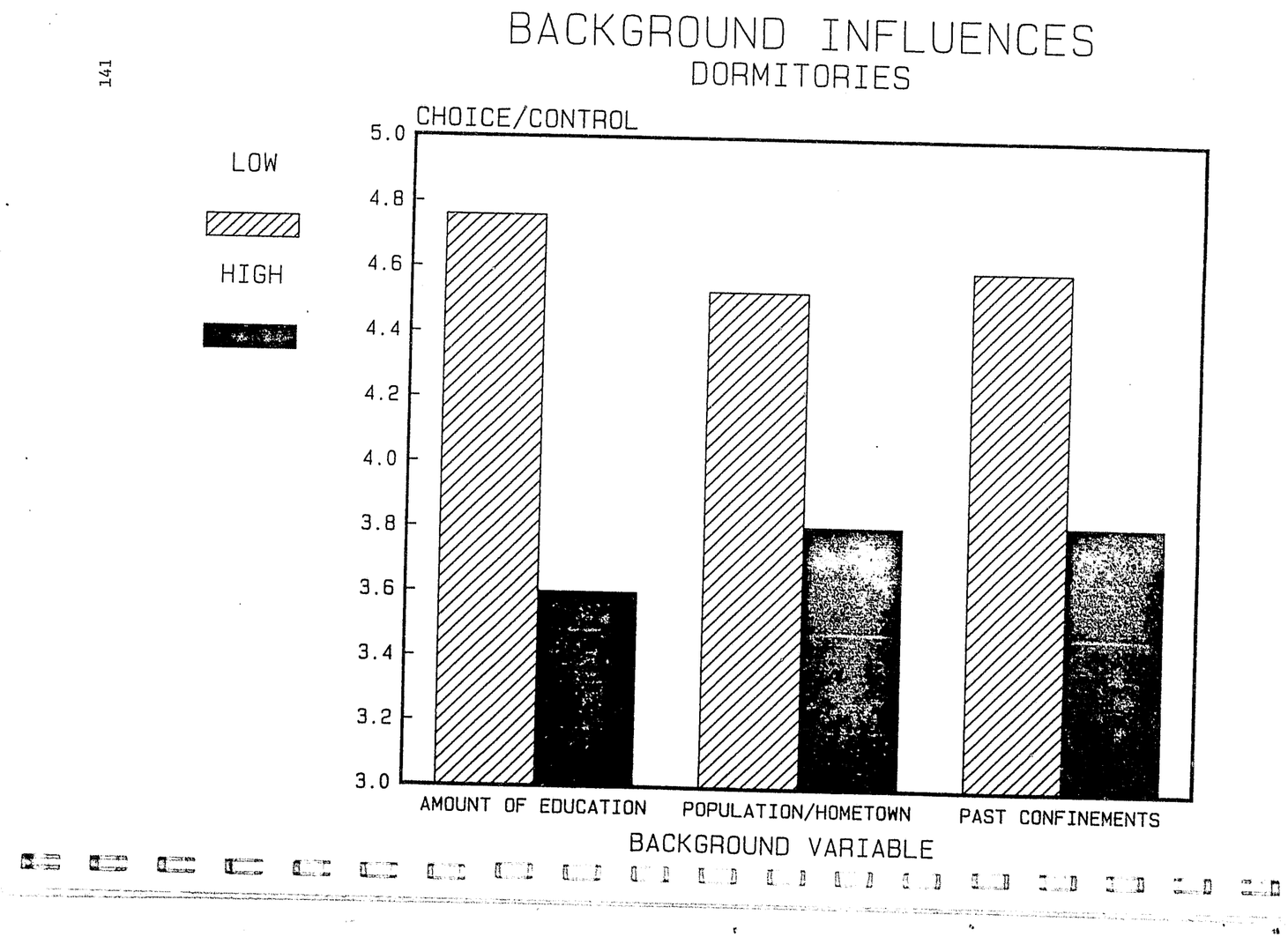


Figure 20. Background influences on perceived choice or control in dorms.



who grew up or lived in a town of greater than 30,000 population reacted relatively positively to singles but negatively to dormitories (Figures 18 to 20). In contrast, individuals who grew up with 6 or more individuals in the home reacted somewhat more positively to doubles and dormitories than those who grew up in less crowded homes. The results for doubles were particularly striking, in that large home size was associated with lower perceived crowding, higher ratings of control and lower illness rate (Figures 21 to 23).

The overall pattern of results for the hometown and homesize variables suggests that variables which are more clearly related to crowding experiences differentiate better the degree of negative reaction to crowded living conditions (doubles and dorms). Crowding in the home was most clearly related to reaction to doubles, and in fact this is the only variable among all of the variables considered in this study which strongly differentiates reaction to doubles. In retrospect, this result is quite sensible. Living in a crowded home most likely involved sharing a bedroom with someone. This experience may have led to either enhanced tolerance of sharing one's sleeping space or the learning of techniques or coping skills which make such conditions more tolerable. The negative reaction to dormitories (but not singles and dorms) of those who grew up in large towns or cities appears a little more mysterious. One might expect such individuals to be better able to tolerate the crowded conditions of dormitory living, simply because they have lived in a relatively more crowded community. Yet, it should be remembered that this type of crowding experience is external to one's home. Such external crowding in fact has been related to social avoidance or withdrawal behaviors (e.g., Milgram, 1970). So if crowded city living breeds individuals with a low tolerance or desire for contact with strangers, the negative reaction of such individuals to living in an open dormitory with a lot of strangers is quite understandable.

The homesize and hometown findings suggest that one cannot simply predict

Figure 21. Influence of homesize on perceived crowding in doubles.

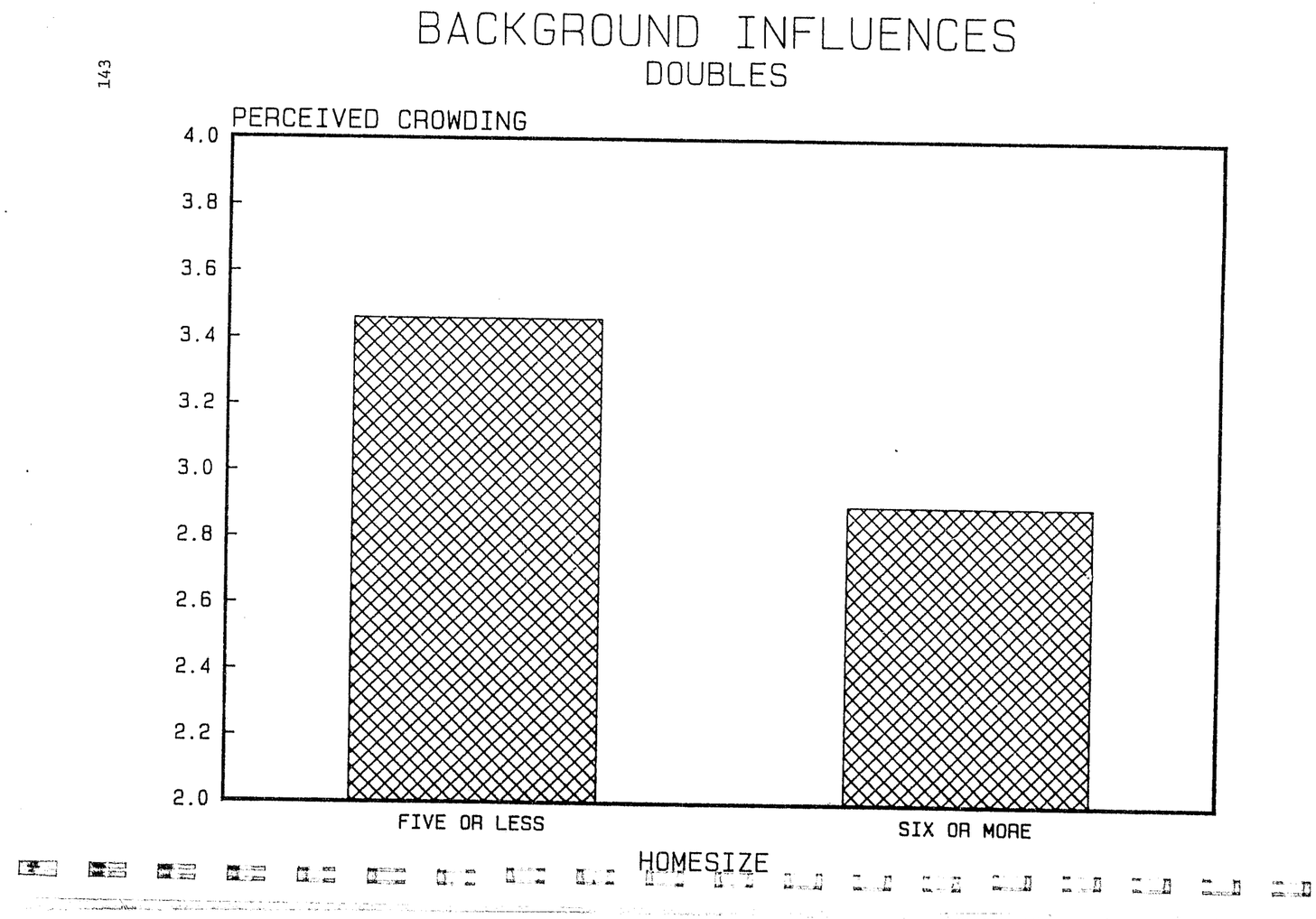


Figure 22. Influence of homesize on perceived control in doubles.

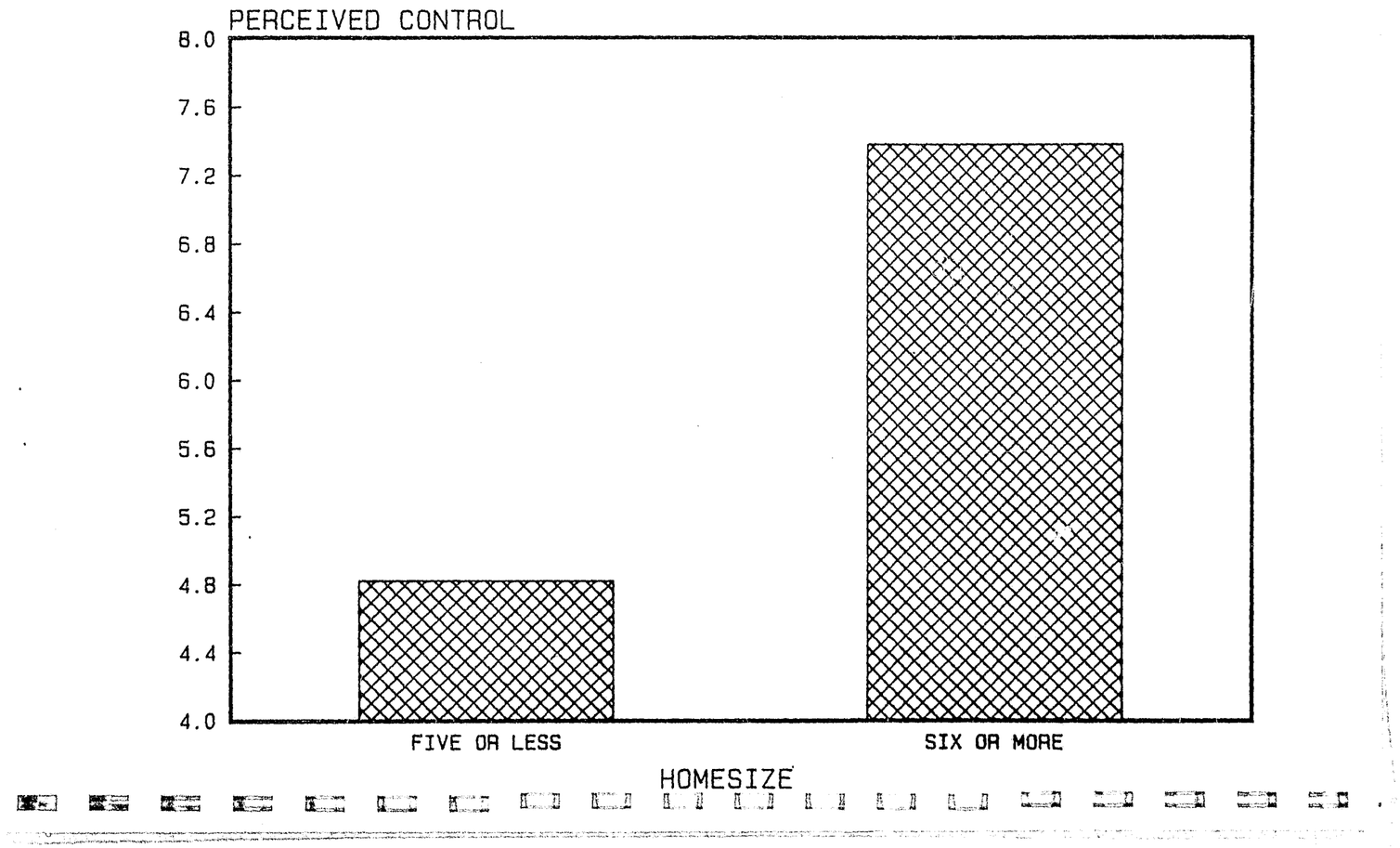
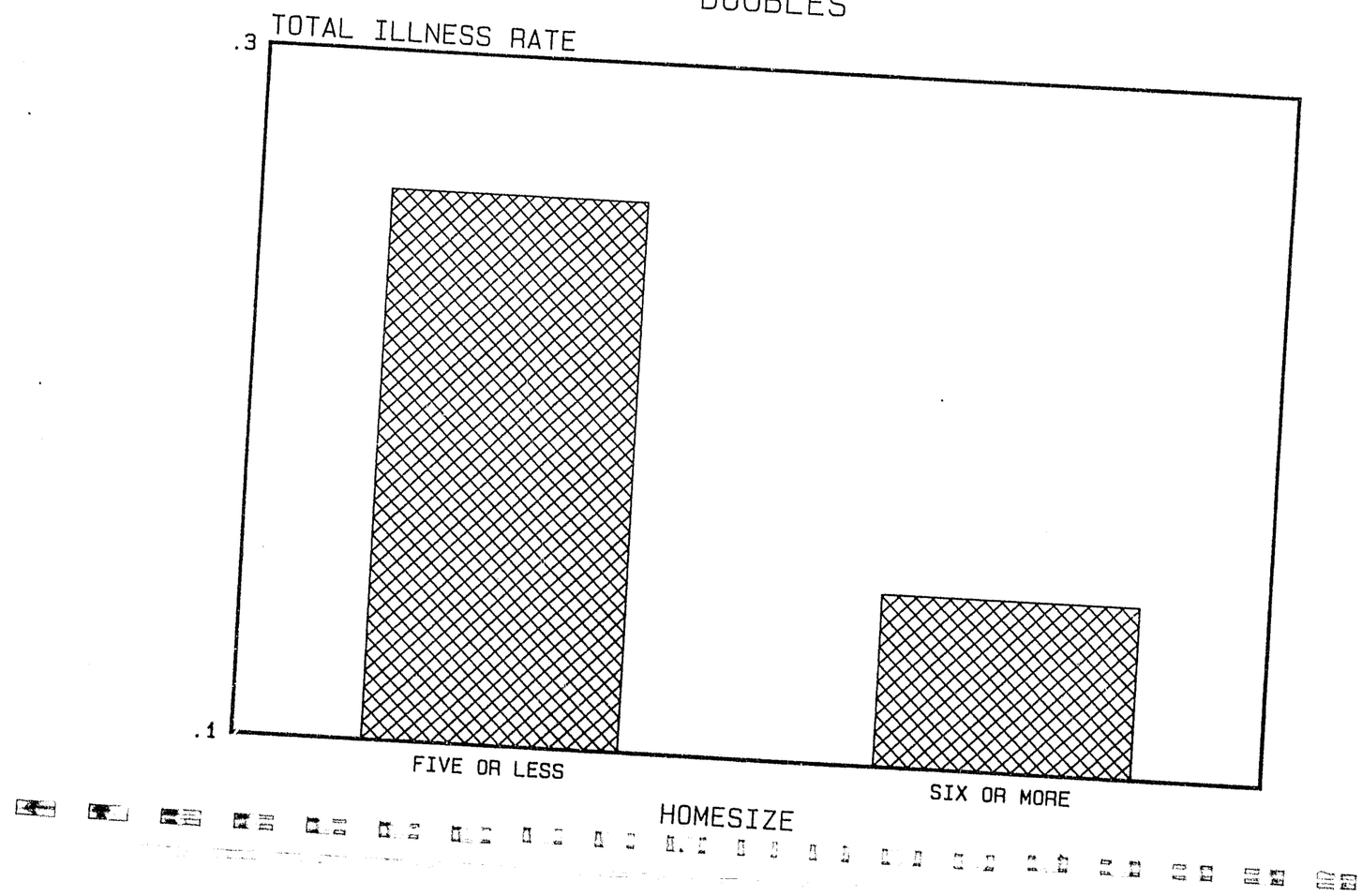


Figure 23. Influence of homesize on illness on doubles.



reaction to crowded housing from a global measure of crowding experience. Instead, reaction to specific types of housing depends on the extent to which past experiences have prepared individuals to cope effectively with or tolerate specific housing conditions.

The influence of criminal history variables on reaction to housing was also assessed. One concern was the influence of length or frequency of past confinements on reaction to prison housing or life in general. Does a more extensive prison history lead to negative reactions or does it lead to greater tolerance? The results indicate that prior prison history, particularly the total length of prior confinements, is associated with negative reactions to doubles and dormitories. The psychological reactions in dormitories were particularly affected (Figures 18 to 20). Thus, it appears that extensive prior prison history leads to less tolerance for crowded prison housing. One reason may be that individuals with an extensive prison history are likely to have spent part of their time in single cells, especially toward the end of their prior sentence. This fact may make them especially sensitive to the relative deprivation of living in dormitories versus singles.

The impact of total length of confinement for the present prison term was also considered. The influence of this variable is more apparent in singles, possibly because one finds a broader range of confinement time for inmates in such housing. Further, in singles the effects of confinement may be seen independent of reactions to crowded housing. Increased length of confinement in singles was related to negative psychological reactions but lowering of illness rate and blood pressure. Thus, while some degree of physiological adjustment may occur with increased length of confinement in prison, psychological reactions to the prison environment become increasingly negative. This finding again highlights the disparity between psychological and somatic reactions.

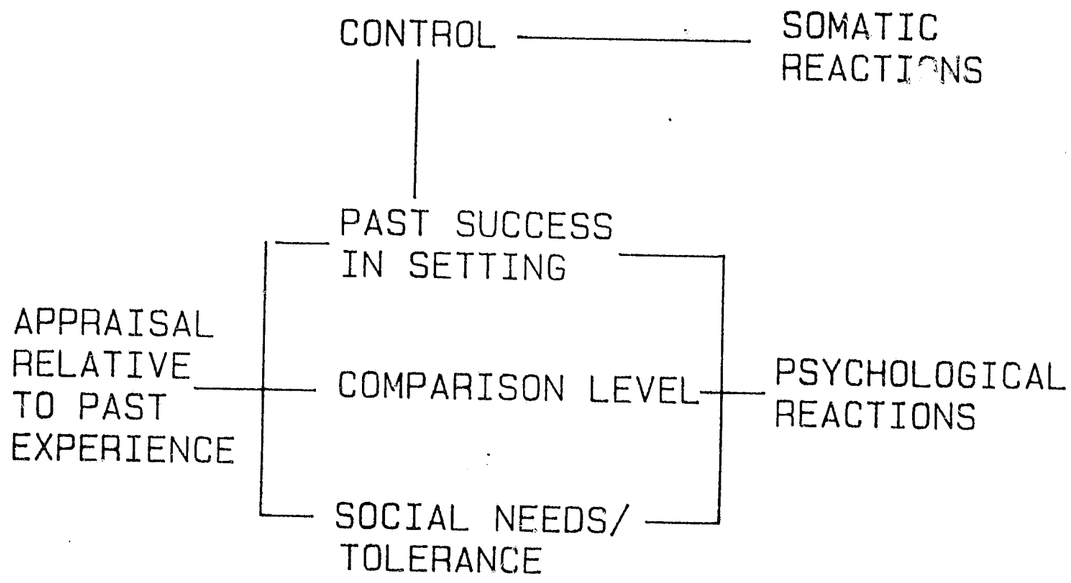
In general, the results of the background and experiential variables

suggests that these may be important in determining reaction to crowded living conditions. One could view these variables as influencing the appraisal process in the theoretical models presented earlier (Figures 15-17). One is likely to evaluate or appraise one's present environment in terms of one's past success in this setting, one's past exposure to similar settings (comparison level) and the degree to which one values privacy or desires social contact (social needs or tolerance). These factors thus influence the extent to which an environment elicits positive or negative reactions. Furthermore, as depicted in Figure 24, past successs in a particular setting may also influence feelings of control and hence somatic reactions in a particular environment. It should be noted that only a small amount of the illness variance is accounted for by the background or experiential factors (about 3% or less in the overall analysis). In contrast, a much larger percentage of the variance of psychological reactions is accounted for by these same variables (up to 20%) (Table 24). This finding provides further support for the relationships depicted in Figure 24. Appraisal relative to past experience is seen as affecting primarily psychological reactions.

One of the major concerns of this project was to evaluate the role of tolerance for crowding in reactions to prison housing. We have assumed a number of times in our discussion that the influence the various background and experiential variables is mediated in part by their impact on tolerance (Figure 24). In this study an attempt was made to tap tolerance directly and assess the predictive power of such measures. Simple direct measures of tolerance could provide a potentially convenient method for screening individuals who are likely to have problems in certain types of housing.

Tolerance for crowding was measured in a variety of ways. Three of the measures provided rather similar results - degree of tolerance for crowding in a dormitory, the individual's preferred or ideal number of inmates in a dorm and

Figure 24. The appraisal process in the revised social interaction-demand model.



the degree to which inmates were bothered by people rather than space. For each of these measures, greater tolerance for crowding or people was associated with more favorable reactions to dormitories, but not doubles or singles. These measures thus seem to tap quite well sensitivity to living in crowded dorms, but not reactivity to singles or doubles.

A more elaborate means of assessing crowding tolerance involved the use of the housing preference test. This test was designed to assess sensitivity to both the amount of space and the number of people in one's housing unit. The results on this test revealed that those items which tapped primarily degree of tolerance for large numbers of people in one's housing (with space constant), predicted reactions to dormitories much as the previous tolerance measures. Those items that involved both a sensitivity to amount of space and number of people predicted reactions primarily to singles. Reactions to doubles were not strongly related to any of the preference types.

Although this test demonstrates the potential utility of tapping specific preferences (e.g., for number and for space), the utility of the test was limited by the fact that all comparisons involved variations in social density. Sensitivity to space could be assessed more effectively by holding social density constant but varying space only.

In general the results for the tolerance measures indicates that tolerance for crowding is specific rather than general. Tolerance for dormitory crowding or social density predicted reactions to dorms but not to singles or doubles. Preference for privacy or low social density, even at the expense of low levels of space, predicted reactions to primarily to singles. The importance of specificity in predicting the effects of tolerance is consistent with the apparent importance of specificity of experience in predicting the role of background factors in reactions to prison housing.

Conclusions

In this paper we have marshalled considerable evidence that crowded living conditions are a source of stress in prisons. Although this argument has been made before (Cox et al., 1982), the detailed analysis of the illness data and the urine chemistry study provide additional evidentiary support. Open dormitories produce elevations in illness which are deemed by physicians to be verifiable and noncontagious and elevations in epinephrine and norepinephrine, as well as a variety of negative psychological reactions.

The impact of housing type on psychological and somatic reactions was not completely consistent however. While a variety of background factors predicted psychological reactions to housing, illness was mainly affected by time in prison or in housing. However, time in housing did not influence psychological reactions, except for feelings of control. Furthermore, while dorms and doubles elicited similarly negative psychological reactions, only dorms exhibited increased levels of illness complaints, headaches, epinephrine and norepinephrine.

The discrepancies between the psychological and somatic measures and some of the other findings of the project were the basis for the development of a theoretical model. The results of this study indicate that simple models of stress may not adequately account for the complexities involved in the study of environmental stressors such as crowding. Yet the proposed model should be considered only a tentative solution. Strong confirmation of this model will be possible only through additional studies in both prison and non-prison environments that are designed specifically to assess the various elements of the model.

Another major focus of the project was an evaluation of the role of tolerance for crowding in reactions to housing. Several instruments successfully tapped tolerance for dormitory crowding and predicted differential reactions to this type of housing. All of these measures of tolerance tapped

the extent to which individuals were sensitive to the number of people in a housing unit. Reactions to singles were predicted quite well by items on a housing preference test that measured sensitivity to both spaciousness and number of people. The results for tolerance indicate that tolerance does appear to play a role in reactions to various types of housing. One striking feature of these results was the fact that tolerance seems to be rather situation-specific. Tolerance for number of people in a housing unit predicted reaction to open dormitories but not singles or doubles. Reaction to singles was predicted by the housing test items which involved both spatial and social considerations. These same items did not predict reaction to doubles and only weakly reaction to dorms. These findings suggest that tolerance for crowding is not a global or general trait. Instead, tolerance for different types of housing may rather be specific to that type of housing. The results on background factors also reinforces the conclusion that only specific types of crowding experience enhance tolerance for crowding in specific housing types.

Future research will have to determine more precisely the role of tolerance in reaction to crowded environments. In particular, longitudinal studies will be required to assess the causal role of tolerance. Our present results for the tolerance measures could be interpreted either as the impact of tolerance on negative reactions to housing or the impact of negative reactions to housing on tolerance for that housing.

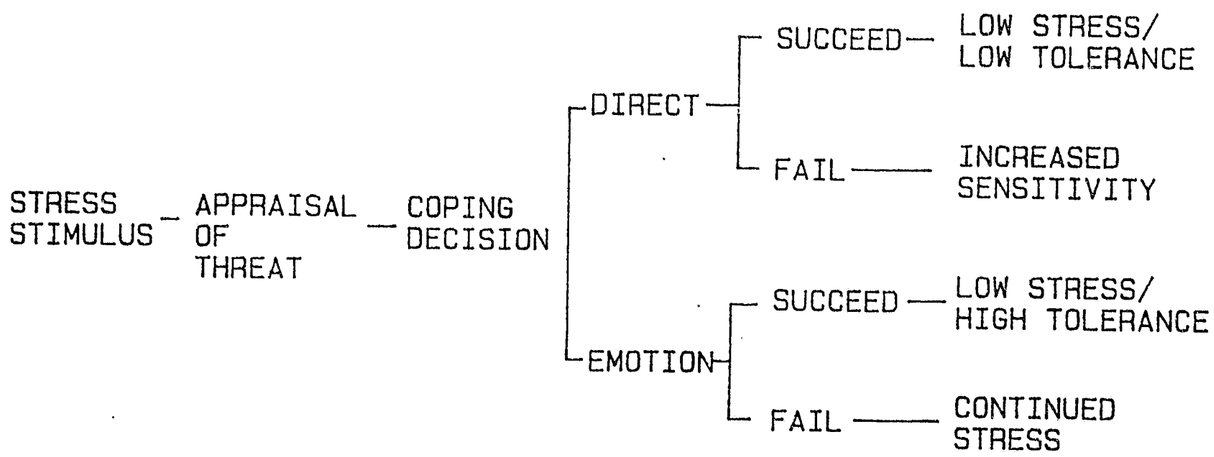
Another important gap in our knowledge is the role of coping responses in ameliorating reaction to prison crowding (Fleming, Baum, & Singer, 1984). Our measures of prison activities and social behavior provided some evidence that club activities and involvement in sports may aid individuals in coping with prison conditions. These results were not terribly strong, however, and it may be necessary to develop more specific measures of coping responses or styles in order to predict more accurately adjustment to various environments (Folkman,

1984). The relationship of coping and tolerance also needs to be examined. Two different types of coping are often recognized, emotional and direct problem solving (cf. Folkman, 1984). Emotional coping involves trying to reduce the emotional distress by various cognitive techniques such as reevaluation of the stressor stimulus as nonthreatening. Direct or problem solving coping involves direct behavioral attempts to change the stressor situation. Although these two strategies may often be used simultaneously, situational factors may result in one being predominant over the other.

The general crowding stress model (Figure 15) can be extended to incorporate this type of coping process. As shown in Figure 25, if a stress stimulus leads to an appraisal of threat, a coping decision may ensue. The individual may choose either direct/problem solving or emotional coping strategies. Each of these may of course succeed or fail, but the consequences of success or failure may depend on the coping strategy chosen. If one succeeds with a direct attempt to change the stressful situation, stress should be lowered. However, no greater tolerance of the original stress stimulus may ensue since one has managed to avoid it (cf., Matthews, 1980). Failure of a direct coping attempt may result in increased sensitivity and stress since one may realize that the stress stimulus may be more problematic than suggested by the original appraisal (Fleming et al., 1984). Successful emotional coping should lead lowering of stress as well as increased tolerance since the stress stimulus would be reevaluated as nonthreatening. Failure of emotional coping should lead to continued stress since one has not been able to reevaluate the stress stimulus.

Another important issue is what factors determine whether a particular coping strategy is employed. It is often presumed that in situations where individuals have some expectations that direct problem solving techniques will be successful, these techniques will be employed. Where success of such

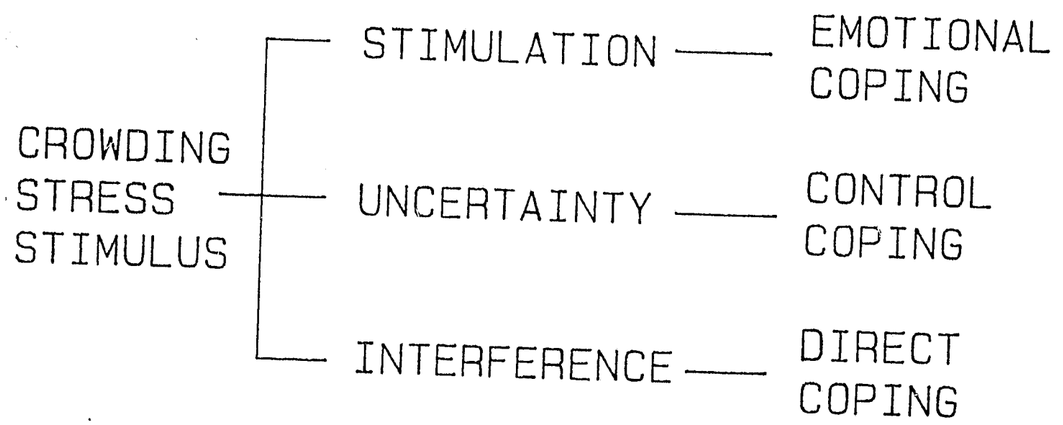
Figure 25. The role of coping and tolerance in a crowding-stress model.



techniques is unlikely, emotional coping may predominate (cf. Folkman, 1984, Fleming et al., 1984). An interesting possibility is that different components of the environmental stress stimulus may elicit different types of coping reactions. For example, the different components of the crowding stress stimulus highlighted in the social interaction-demand model may elicit a somewhat different coping responses (Figure 26). Interference may best be dealt with by direct attempts to reduce the interference (e.g., setting up formal or informal rules of interaction). Stimulation may be more difficult to handle in direct problem solving manner (one often cannot change the number of people in one's housing unit or environment), so one may have to resort to reevaluation of the stimulus (e.g., people) if this is feasible. Uncertainty may be reacted by attempts to reduce uncertainty (getting to know the people or the environmental characteristics) or to gain a greater sense of control (e.g., become friends with the right people).

In sum, this project has provided much useful data of both a pragmatic and theoretical nature. Future studies will need to assess the generality of our findings in other environments and will have to assess specifically the underlying processes which have been posited as being responsible for the observed relationships.

Figure 26. The potential role in the social interaction-demand model.



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Footnotes

[1]This project would not have been possible without the generous support of LEAA and NIJ during the past six years. The support of these agencies and their personnel is greatly appreciated. Thanks are also due to Patrick Langan and Helen Erskine for their support and encouragement during the Visiting Fellowship project.

Most of the data on which this project is based was gathered in conjunction with Verne Cox and Garvin McCain. The followship period facilitated the writing of a number of papers which summarized our previous work and current theoretical ideas. I owe a great debt to these two colleagues for their labors, drive and intellectual zeal during the past 14 years of our joint endeavors.

During the fellowship period I was given the status of Visiting Professor at the Uniformed Services University of the Health Sciences. I was afforded space and utilization of facilities in the department of medical psychology. Marc Scheaffer worked diligently and expertly as my research assistant while Dr. Andrew Baum served as intellectual resource and resident humorist. The hospitality of the faculty and staff of the Medical Psychology Department during my tenure there is greatly appreciated. Baum and Scheeffer also collaborated on a urine chemistry study of stress at Danbury FCI.

Dr. Gerald Gaes of the Research Office, Bureau of Prisons, collaborated in the Danbury study as well as in the reanalyses of the illness data. Dr. Gaes also provided statistical and programming expertise at various points in the project. His support and that of other members of the staff of the Research Office were of great benefit to the project.

[2]This part of the project was done with the assistance of Dr. Gerald Gaes of the Federal Prison System. Susanne Dawson provided superb assistance with the recoding of the illness data.

[3]Thanks are due to Lt. Col. William J. Meinert, DeWitt Army Community

Hospital, Dr. John Paul McCarthy, HMR Malcolm Grow Hospital and Lt. Col. Edward Perkins, Bolling Air Force Base, for aiding in this project. The help of the physicians and medical staff of these institutions and those of the federal prisons in filling out the questionnaire is greatly appreciated.

Because not all of the specific complaint categories (Table 37) were included on the questionnaire, the results for the broader categories (Table 40) were used to categorize more specific complaints.

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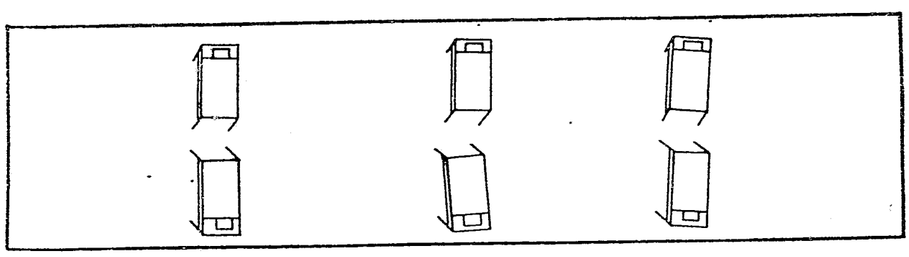
Appendix A

Some sample items from the crowding tolerance test.



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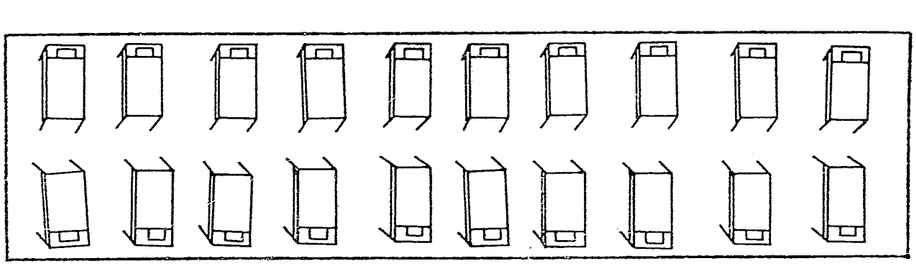

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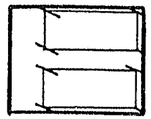
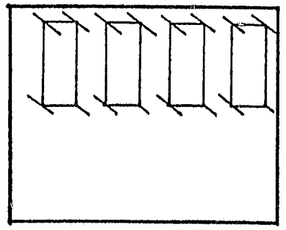
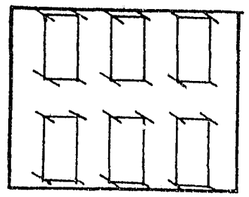
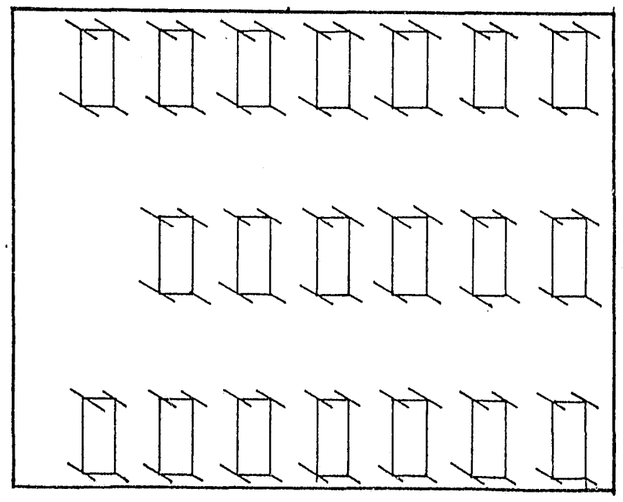
Appendix B

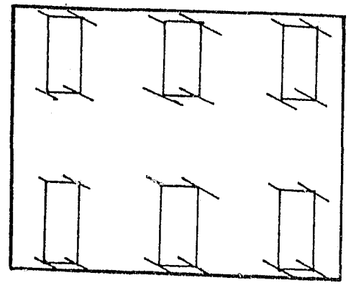
Some sample items from the housing preference test.

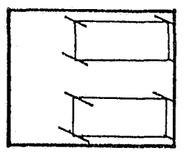












Appendix C

The questionnaire used by medical personnel to rate symptoms.

On the following page is a list of symptoms or symptom categories that have been observed among prison inmates.

Please rate these symptoms along each of the four indicated dimensions.

1. CONTAGIOUS - How likely can this type of illness be transmitted from one person to another? (L=Likely; U=Unlikely; ?=Don't Know)

2. STRESS SENSITIVE - How likely can this type of illness be caused in part by stress? (L=Likely; U=Unlikely; ?=Don't Know)

3. VERIFIABILITY - How likely can this type of illness be objectively diagnosed? (L=Likely; U=Unlikely; ?=Don't Know)

4. PSYCHOSOMATIC - How likely can this type of illness have a psychological basis? (L=Likely; U=Unlikely; ?=Don't Know)

Please place a checkmark in each category (1,2,3 and 4) for each illness. Indicate for each category whether your answer is "Likely" (L), "Unlikely" (U), or "Don't know" (?). Obviously, some of the symptom categories are rather broad (e.g., eye and ear problems). In these cases, please answer based on the general range of patient complaints that may fall into these categories.

SYMPTOMS	1 CONTAGIOUS			2 STRESS SENSITIVE			3 VERIFIABLE			4 PSYCHOSOMATIC		
	L	?	U	L	?	U	L	?	U	L	?	U
Teeth, Gum Problems												
Stomach Pains												
Hives												
Chest Pain												
Feet Pain												
Swallowing Problem												
Fungus												
Bone Problem												
Joint Problem												
Genital Discharge												
Groin Pain												
Headache												
Bodily Injury												
Malaise												
Rash, Itch												
Acne												
Asthma												
Nausea												
Nerves/Anxiety												
Cold and Flu												
Smell, Touch Problems												
Limbs Problem/Pain												
Ulcers												
Swelling												
Neck and Shoulder												
Eye and Ear Problems												
Sweating												
Digestive Problems												
Muscle Pain												
Kidney Problems												
Breathing Difficulty												
Psychological Problem												
Insomnia												
Nasal Sinus Problem												
Hearing Voices												
Depression												
Dizziness, Fainting												
Back Pain												
Hemorrhoid												
High Blood Pressure												
Migraine												
Cysts and Tumors												
Urine Infection												
Arthritis												
Hernia												
Heart Problems												
Genital Sore												
Virus												
Dandruff												
Menstrual Problems												
Overweight												
Sore Throat												
Hallucinations												

END