MEI

A Preliminary Study of Crowding in Jails

Garvin McCain and Paul Paulus

February 1982

Report National Institute of Justice Contract #1-0296-J-OJARS.

Acknowledgements

As in most complex projects, the authors cannot take sole credit for the research reported. We had excellent cooperation from the sheriff's departments in Dallas and Harris Counties. A number of our colleagues also made substantial contributions. Finally, the cooperation of many inmates made the whole project possible.

Although we cannot thank each individual who participated we do wish to acknowledge some of them.

Dallas County Sheriff's Office

Sheriff Don Byrd

Major Charles Matter

Chuck Fawns

Assistant Chief of Deputies James Bowles

Officer Helen Atkinson

Officer R.W. High

Officer Clyde Singletary

Harris County Sheriff's Office

Sheriff James Heard

Director of Research Bill Broome

Major Duncan

Captain Hilhorn

Captain Wedemyer

Lt. Porter

Officer B.M. Runnels

Officer Gary Worley

University of Houston

Eugene Gilden

University of Texas, Arlington

Dr. Ira Bernstein

Calvin Garbin

Pauline Gregory

Marcy Newton

Connie Pusen

Treva Rice

Federal Prison System

Dr. Jerry Gaes

As is our usual practice, order of authorship was determined by random lot.

Introduction

There has been much interest recently in the issue of overcrowding in jails and prisons. The U.S. prison population is soaring (Bureau of Justice Statistics Bulletin, 1981) and present facilities are inadequate to hold this growing number of inmates (Attorney General's Task Force on Violent Crime, 1981). The result has been numerous suits brought to court to protest these conditions. Resultant court actions often limit the population in prisons but may lead to even more extreme overcrowding in jails because of lack of available space in prisons.

Research has shown that overcrowding in prisons can have quite detrimental effects (e.g., McCain, Cox, Paulus, 1980; Cox, Paulus, McCain and Karlovac, in press; Paulus, McCain and Cox, 1978; D'Atri and Ostfeld, 1975). These studies have shown that social density (number of people in one sleeping unit), spatial density (square feet per person), institutional size, degree of privacy, and inmate turnover all contribute to crowding stress. More crowded environments have been associated with increased illness complaints, elevated blood pressures, psychiatric committments, higher death and suicide rates, and generally negative psychological reactions.

The above studies suggest that jail overcrowding should have similarly negative effects. Yet, we know of only one limited study of overcrowding in jails (McCain, Cox and Paulus, 1976). In that study, we collected some data on illness complaints from the Dallas County Jail. Our findings indicated that there were substantial differences in illness complaint rates related to crowding. Unfortunately, the effects of social density (number of inmates in one unit) and spatial density (square feet per inmate) could

not be separated and no additional measures were obtained.

There exists a need to establish the extent to which effects observed in prisons also occur in jails. Since research in other environments such as college dormitories (Baum and Valins, 1977), naval ships (Dean, Pugh and Gunderson, 1978), and junior high schools (McCain, Cox, Paulus, Luke and Abadzi, 1982) have generally shown similar results, one would expect our prison findings to generalize to jails. Yet there are substantial differences between the jails we have visited and prisons which could affect responses to crowding. While some of these factors seem likely to increase the negative effects of crowding, others might ameliorate these effects.

A large part of our prison data has been collected in the Federal Prison System. While many of the institutions in this system have a wide range of housing types, housing density does not reach the high levels encountered in jails. For example, the least spacious housing in federal prisons is a 27 sq ft double. Open dormitories with 30 to 70 inmates have from 30 to 60 sq ft per inmate. In jails square footage in multiple occupant cells (up to 8 inmates) may range only from 13 to 38 sq ft. Our prison studies showed social density to be a more important factor than spatial density (c.f. McCain et al., 1980). Yet at the low levels of space in the multiple occupant cells in jails space may become a more important factor since the extremely close confinement increases the likelihood of negative social encounters.

The total period of confinement in jails is typically less than in prisons, although we have found cases where inmates have been in the same

jail for about 4 years. One effect of the relatively short confinement is a very high rate of inmate turnover in jails. Prior research (McCain, Cox, Paulus and Karlovac, 1981) has indicated that turnover may be an important factor in the experience of crowding. This may be the case in part because of the difficulty of establishing social organization when there are high levels of turnover. Yet the relatively shorter periods of confinement in jails could also lessen the negative effects of crowded conditions. The length of exposure to crowding is of course shorter, but there is also the knowledge for many that one will be able to leave soon. This knowledge may lead to an enhanced sense of psychological control. Such a sense of control seems to be important in ameliorating the potential negative impact of stressors (Cohen, Glass and Phillips, 1979).

Freedom of movement is much more restricted in jails than in prisons. Many jail inmates remain in the same cell or tank for 24 hours per day except for taking meals in a central dining room. Few prison inmates are confined for such periods except for disciplinary or protection cases. Related to these differences in confinement is the fact that only limited numbers of jail inmates have jobs within the institution. Due to this long period of daily confinement and the general lack of recreation and educational activities, jail inmates have a great deal of unoccupied time. This could enhance the effects of crowded living conditions.

Housing assignment policies in jails and prisons are usually quite different. Prisons often have a security classification which determines the type of inmates assigned to a particular prison. Within each prison there may be some variation in security classification, with the range of

classifications depending on the security level of the institution. However, inmates are often not assigned to housing on the basis of security classifications. Most often we found an arbitrary assignment of inmates to available housing. Dependent on good behavior, inmates in some prisons move to more preferred housing over time. In some cases housing is based on type of program (e.g., employment, drug abuse, honor). In jails there is usually a large number of security classifications based on age, charge, previous record, etc. In jails inmates tend to be assigned to housing on the basis of these classifications and move only if these change (e.g., to work, honor, or school status). The type of classification may influence response to crowding. For example, living among a group of violent inmates may be more stress inducing than living among nonviolent inmates.

Jail inmates appear not to be as well educated as federal prison inmates. In some jail settings we have found one-third or more of the inmates incapable of reading and understanding a simple questionnaire. It is rare that a prison inmate has not spent at least some time in jail prior to reaching a prison. On the other hand a jail inmate may not have been in any institution prior to being in jail. Almost all prison inmates have been convicted of a felony. In contrast many jail inmates may have been convicted of a misdemeanor or may not have been tried, whatever the alleged offense. These differences may affect inmates responsiveness to crowding.

In summary, there are very substantial differences in jail and prison situations from the standpoint of housing conditions, personal characteristics, and individual experiences. These factors may influence the nature of crowding effects obtained, thus investigation of jail environments will

aid in assessing the generality of findings based on research in prisons.

The present study was designed to examine the effects of different types of jail housing on the psychological and physiological health of the inmates. We tested inmates in three county jail facilities in Texas. Each of these institutions contained housing units that varied in terms of space per person (spatial density), number of persons living in a cell or room (social density), and number of inmates in one housing unit (external density). Each of these three factors have been shown to influence inmates' reaction to housing in prisons and other environments.

The research reported in this paper represents a pilot study, the results and conclusions are necessarily tentative. Any definitive study should cover a much larger array of institutions and larger samples. A primary aim of the present project was to determine the feasibility of extending our work in prisons to jails. One important factor is the accessibility of jails for this type of research. In the past we have encountered severe difficulties in attempting to work in state prisons because of concern about the impact of our work on lawsuits. Jail authorities may have similar concerns. We also wanted to assess the availability of different types of housing within each institution since cross-institutional comparisons are extremely difficult to interpret. The extent to which the instruments and measures we have developed for use in prisons can be used in jails was unclear. Finally, there are special problems of physical arrangements and access to inmates in jails. In prison environments there have been at least minimal facilities available for interviewing and testing inmates. Prisoners generally have at least limited ability to move within

the institution. This is often not the case in jails. In prisons we have had excellent cooperation from inmates and correctional personnel. Whether such cooperation would be found in jails was not known. Our experience in conducting this study should shed some light on these questions of feasibility.

A second major objective was to assess the generalizability of our prison findings to jail settings. In some cases it is not possible to check these findings. However social and spatial density do seem to be factors that can be compared. In future studies to achieve a wide range of comparability will require examination of multiple institutions and large samples over a period of time.

General Procedure

The procedures were the same at each institution except for some minor changes which will be noted later. Initially, we made one or more site visits to determine whether data collected at the jail would be useful or possible. The principal criterion was whether meaningful comparisons of different types of housing could be made. For example, a comparison of two- and eight-man cells would be useful, whereas just having crowded eight-man cells would not be. Another important factor is inmate assignment policy. If in the above comparison all the two-man cells were minimum security while the eight-man cells were for violent recidivists, the comparison would be confounded and of limited use.

During site visits we attempted to obtain floor plans. Sometimes these did not exist or were inaccurate. Hence measurement of the housing units was sometimes required.

Although we have tested inmates in widely varying locations ranging from corridors and libraries to chapels, there are some constraints because of the equipment. In jails, unlike prisons, we have found it necessary to hire off-duty officers to escort inmates to and from the testing site. At the minimum security institution we used a single officer, and where the security level was higher we used two officers. In the latter case inmates were brought in in groups of five or six, with one officer remaining at the testing site.

When inmates arrived, the study was briefly explained and informed consent was obtained (see Appendix A). Very few inmates declined to participate. Next, the inmates either filled out a questionnaire (see Appendix B), or went to one of the two blood pressure stations. One person supervised the filling out of questionnaires, and two took blood pressures.

Measures Used

The questionnaire used was much shorter and somewhat simpler than we have used in prisons. In cases where the inmates had difficulty with reading, the questionnaire was read to the inmate. The questionnaire asked them to rate their housing unit for crowding on a four point scale (uncrowded, moderately crowded, crowded, very crowded). They were also asked to rate their housing unit along various dimensions on 7 point semantic differential scales. The dimensions were good-bad, attractive-unattractive, right number of people-too many people, pleasant-unpleasant, uncrowded-very crowded, well arranged-poorly arranged, comfortable-uncomfortable, quiet-noisy. They were asked to choose between too many people and too little space, as to which one bothered them most. Two questions asked if they

never, occasionally, or often had trouble sleeping or headaches. They were also asked to list, up to three items, the things that bothered them most about their housing.

Blood pressure was primarily assessed using an Electrosphygmomanometer (PE 300 Narco Biosystems). On one trip we employed the ordinary sphygmomanometers because of problems with the other equipment.

We also collected illness data from hospital or clinic records for a period of up to six months prior to the testing date. Individuals who had been in the institution less than one week were not included in these data. At the Dallas County Jail medical information is maintained for all inmates who visit the clinic. For Harris County a folder is available for all inmates whether they have visited the clinic or not. Typically when an inmate visits the clinic for any purpose a dated entry is made which includes a description of the complaint. This information was noted on our data sheets. We used only inmate initiated visits to determine illness complaint rates. We did not use routine medical examinations, dental appointments, or visits occasioned by injuries. Where an inmate had more than one complaint on a given day, all were recorded but this was scored as only one complaint. We were not able to use illness complaint data from Woodlawn (Dallas) in this study due to the fact that there were only a few inmates who had complaints.

Dallas County Jail

At the time of our visit Dallas County Jail held about 1000 inmates. Housing ranges from singles to large open dormitories, but most inmates are held in tanks consisting of 4 or 8-man cells. Inmates are assigned to

tanks on the basis of various classification categories such as recidivist, violent, protective custody, first offenders, etc.

We chose the 4 and 8-man cells for comparison since this was the only housing variation not totally confounded by type of inmate (e.g., trustee, first offender, etc.). These cells were located on two different floors. The 4-man cells measured 5½ feet by 13½ feet, yielding 18.6 square feet per inmate. These cells were contained in tanks consisting of five 4-man cells and one 6-man cell. Total tank population ranged from 22 to 26. Inmates in these tanks had access to a 354.5 square foot dayroom.

The 8-man cells measured 8 feet by 16 feet, yielding 16 square feet per inmate. They were contained in tanks with 4 to 5 cells. Since population in all of the tanks was 32, the actual number of inmates in the cells actually ranged from 6 to 8. The inmates had access to a 478.5 square foot dayroom.

All of the inmates in our sample were classified as recidivists. One half of our sample within each cell type came from tanks holding only inmates classified as violent while the other half came from tanks classified as nonviolent. This classification is made on the basis of background information, such as the FBI sheet and local records. An inmate is classified as violent if he meets any one of three criteria: (1) three or more arrests for violent offenses within the past five years, (2) one or more past convictions for a violent offense, or (3) presently charged with a violent offense. A total of 79 inmates were tested from 13 tanks. The testing took place in the hallway outside the tanks.

Since the 8-man tanks had more inmates per cell in the tank than the 4-man tanks, it was expected that the 8-man tanks would produce relatively

more negative reactions. However, the spaceousness of the 8-man dayrooms could counteract such an effect. Furthermore, the fact that all of the inmates in this sample are confined all day in relatively dense conditions may mitigate against finding a difference between these 4-man and 8-man cells. It was expected that the violent tanks would be more stress inducing than the nonviolent ones because of the potentially more volatile nature of the population overall, and possibly due to the personality types of the individuals.

Results

Results from Dallas County Jail were analyzed by means of a 2 x 2 analysis of variance with social density or tank type (4 vs. 8) and classification (violent vs. nonviolent) as factors. Since age varied significantly among the tanks (with the nonviolent being younger), this variable was used as a covariate in our analysis.

Social density or tank type (4 vs. 8) did not significantly affect any of our measures. However, the type of classification of the inmates in the tank did have a number of effects. As shown in Table 1, violent inmates rated their environment as more crowded and reported more problems sleeping but had lower systolic blood pressures than nonviolent inmates.

- - - - - - - - - - - - - - - - - -

Table 1 about here

- - - - - - - - - - - - - - - - - -

To provide a more exact picture of some of our results, we also examined the frequency with which each group rated themselves as "very crowded" (the highest possible crowding rating). The violent inmates used this

Table 1

Results for Dallas County Jail

Dependent Variable	Unit Type: Non-Violent	Unit Type: Violent	p-value
Perceived Crowding	2.46	3.12	.01
Trouble Sleeping	2.03	2.43	.02
Systolic Blood Pressure	125.80	115.80	.0006

category 42.5% of the time, the nonviolent 20%, a ratio of 2.13 to 1. The difference was significant ($\chi^2 = 4.71$, df = 1, $p < .05$). A similar analysis with sleep problems found that 47.5% of violent inmates reported "frequent" sleeping problems, while 25.6% of the nonviolent inmates used this category, a ratio of 1.79 to 1. This difference was significant ($\chi^2 = 4.03$, df = 1, $p < .05$).

An analysis of variance based on individual illness complaint rates was not significant, possibly due to the high individual variability. However, when violent and nonviolent inmates were compared based on the number of inmates who had been to the clinic one or more times there was a significant difference ($\chi^2 = 5.21$, df = 1, $p < .025$), with the incidence for violent inmates being higher (a ratio of 1.91 to 1). If the period after the first six weeks is used the difference is even more striking. The rate for violent inmates (52.6%) was much higher than for the nonviolent inmates (15.4%), a ratio of 3.42 to 1 ($\chi^2 = 4.59$, df = 1, $p < .05$).

We also compared inmates on the basis of whether they had pre or post trial status. They differed significantly on only three measures: age, length of time in jail and illness complaints. The pretrial inmates were significantly ($p < .04$) older (mean age = 29.9) than posttrial inmates (mean age = 26.1). Pretrial inmates had been in jail significantly ($p < .03$) shorter (mean = 93.2 days) than the posttrial inmates (mean = 194.6 days). Although pretrial inmates tended to have higher illness complaint rates ($p < .06$), this difference disappeared when age and time in jail were controlled by analysis of covariance. Race did not have any independent effects on our dependent measures.

Discussion

The results from the Dallas County Jail are somewhat equivocal. No differences were found for inmates living in 4-man cells or 6-8-man cells. This may reflect the compensatory effect of the relatively more spacious dayroom for the 6-8-man cells. Alternatively, these two housing conditions may not have represented sufficiently different levels of crowding to produce differential effects on our measures. Unfortunately, comparison of these two relatively crowded housing conditions to a relatively uncrowded condition (e.g., singles) was not feasible since singles were used only for protective custody and discipline.

The findings for inmate classification indicated that while violent inmates rate their environment as more crowded, report more trouble sleeping and have higher illness complaint rates than nonviolent tank inmates, their systolic blood pressures were relatively lower. Feeling crowded, having trouble sleeping, and more medical complaints seem quite sensible in response to living among a group of violent residents. However, having lowered blood pressure seems contrary to what one would expect in such an environment. One possibility is that the blood pressure effect reflects a characteristic of violence-prone individuals, whereas the other effects and sleeping effect represent a response to the social environment. Only future research can unravel this puzzle.

Dallas - Woodlawn

Woodlawn is a low security institution in the Dallas County Jail System. This facility is a converted hospital building and housed about 285 inmates at the time of our visits. Inmates are housed here for relatively short periods of time (typically 30/60 days). It consists of four units: women, medium security, minimum security, and work release. Our study was confined to the three male units.

Inmates in the medium security unit were confined to the unit but not to their rooms. The rooms in this unit housed from 1 to 5 inmates. The room size varied from 83 to 299 square feet. Inmates in the minimum security unit were almost entirely housed in doubles. The size of rooms in this unit ranged from 96 to 144 square feet. The work release inmates are in the facility primarily at night and are housed in rooms of 1 to 7 inmates. The room sizes vary from 79 to 204 square feet. The square footage in our sample ranged from 36 to 260 (see Table 2).

- - - - - - - - - - - - - - - -

Table 2 about here

- - - - - - - - - - - - - - - -

Data from Woodlawn was obtained during two research visits. All inmates were tested in an air conditioned library. Data were obtained from 159 inmates.

Results

The effects of sharing one's room with others was determined by analysis of variance. For this analysis, inmates in rooms of five or six were combined because of the small number of inmates in these conditions.

Table 2

Woodlawn Spatial Density Configuration

Social Density	1	2	3	4	5	6	5 & 6
Number of Subjects	28	61	34	19	6	11	17
Mean (sq ft)	135.6	76.3	61.0	61.5	49.9	51.7	51.1
Median (sq ft)	113.4	68.1	55.7	64.4	51.6	44.3	56.7
Range (sq ft)	79/260	56/182	38/88	52/75	36/57	44/61	36/61

Significant effects were found for perceived crowding and evaluation of the room (Table 3).

- - - - - - - - - - - - - - - - - -

Table 3 about here

- - - - - - - - - - - - - - - - - -

From Table 3 it is evident that the inmates' negative evaluations increase sharply from a social density of one through three. After that point the reactions remain relatively level. When the various categories were adjusted to a common mean the relationship can be seen very clearly. This is shown in Figure 1.

- -

Insert Figure 1 about here

- -

Since a large number of doubles came from the minimum security unit, a similar analysis was done using only the other two units. The results were essentially the same with an additional effect observed for ratings of comfort.

It is not clear from the above analysis whether the effects obtained are due to number of people in the room or the amount of space per person. To determine whether social density had an independent role in these effects, an analysis of covariance was employed, assessing the effects of number of roommates while controlling for spatial density and type of unit (medium, minimum, work release). Again, significant effects were obtained for perceived crowding and the three ratings of the room. Thus, it appears that social density has an independent effect on the reactions to the housing.

Table 3

Effects of Number of Roommates for Woodlawn

	Number of Roommates					
	1	2	3	4	5 and 6	p-value
Perceived Crowding	1.2	1.3	1.9	1.7	2.1	.001
Too Many People	1.9	2.4	3.8	3.8	3.6	.01
Unpleasant	3.1	4.2	4.7	4.9	4.5	.03
Crowded	2.1	2.4	3.9	3.2	3.9	.001

Note: A higher score is more unfavorable.

The independent effect of space is somewhat more difficult to ascertain. Spatial density varies widely, partly as a function of room size and partly due to variations in number of roommates. A multiple regression analysis was employed to determine more precisely the relative contribution of spatial and social density. Social and spatial density were entered simultaneously. This analysis indicated that only social density is an independent predictor of perceived crowding and room evaluation (Table 4).

- - - - - - - - - - - - - - -

Table 4 about here

- - - - - - - - - - - - - - -

The effect of space was also assessed by comparing different levels of space within specific social densities. Comparing singles who were above and below the median space (113 sq ft) led only to an effect on headaches, with more headache problems reported with larger space ($p < .05$). A similar analysis for doubles (median 268 sq ft per inmate) revealed greater feelings of discomfort with less space while an analysis of the 3, 4, 5, and 6-man rooms combined (median = 57 sq ft per inmate) revealed no effect.

One important consideration in many court suits is the amount of space per inmate. Suggested standards for minimum space per inmate range from 50 to 80, with 60 being a common standard. Inmates who lived in rooms with 60 square feet or less per person were compared with those who lived in more spacious rooms. The analysis of covariance procedure was employed to control for social density and type of unit. The only effects obtained were for perceived crowding ($p < .01$) and ratings of discomfort ($p < .052$), both more negative with less space.

Table 4

Results of Regression Analyses Using Social and Spatial Density as Predictor Variables

Dependent Variables	Predictor Variables			
	Social Density		Spatial Density	
	Beta	p-value	Beta	p-value
Perceived Crowding	.34	.0002	No	
Too Many People	.24	.02	Significant	
Crowded	.24	.02	Differences	

The effect of unit type was analyzed by using only inmates living in singles and doubles since only these two types of housing are represented in each unit. Unit type was associated with significant effects of age, headache problems, and systolic and diastolic blood pressure (Table 5).

- - - - - - - - - - - - - - - - -

Table 5 about here

- - - - - - - - - - - - - - - - -

Younger inmates tended to be housed in the medium security unit. The elevated blood pressures most likely reflect the fact that the work-release inmates had just returned from work outside the prison and were in a higher state of activation.

The pre- or posttrial status of the inmate had no influence on any of our measures. Information on race was not obtained for this sample.

Discussion

The Woodlawn results indicate that increasing the number of residents in a room leads to increased negative psychological reactions. The amount of space per person did not have any reliable effects. These results are consistent with those of our earlier prison studies which indicated that social density was a more important factor than spatial density. The failure to find health-related effects may reflect the generally low level of crowding experienced in this institution or the very small number of inmates who had used the clinic. Inmates had great flexibility to move about the institution and remained in their units only during sleeping hours. The rooms were relatively spacious compared to typical prison and jail accommodations. The inmates at Woodlawn were selected as nonviolent

Table 5

Results for Unit Type at Woodlawn

Using Only Singles and Doubles

	Unit			
	Work Release	Minimum Security	Medium Security	p-value
Age	40.0	37.1	28.4	.01
Headache[1]	1.4	1.6	2.1	.01
Systolic Blood Pressure	128.0	119.1	113.0	.01
Diastolic Blood Pressure	68.4	64.7	55.5	.001

1. Higher number means more problem with headaches.

and "safe" individuals. Most inmates at this institution have committed minor offenses and do not have a serious criminal background. If one compares the 4-man rooms at Woodlawn with the 4-man cells at Dallas County Jail, one notes that the Dallas County Jail inmates react more negatively. For example, the perceived crowding score in Dallas County Jail was 2.93 while for Woodlawn the score was 1.7 (larger numbers more negative).

Harris Detention Center

The Harris County Detention Center is a large, multipurpose jail. On the day we began data collection, the population was 1,514, of which 545 were Anglo, 711 Black, and 258 had Spanish surnames. As may be seen from Table 6, there was a wide variety of housing conditions available for testing. In addition there are many different inmate classifications.

- - - - - - - - - - - - - - - - -

Table 6 about here

- - - - - - - - - - - - - - - - -

We used two principal groups of inmates in the sample, recidivists and workers (including school tank). There were recidivists in 2, 8, 12, 14 and 24 man cells, workers in 2 and 8 man cells, and a school tank composed of 12, 14, and 24 man cells. With the exception of the school groups, this sample allows comparisons within inmate classification across more than one type of housing. We did not sample from segregation, violent, disciplinary protection, youthful offenders, felony conviction or immigration units. These were eliminated primarily because each of these classifications was found in only one type of cell.

Table 6

Units Involved In Sample

Tank Number	Number of Inmates	Cell Sizes	Sq Ft per Inmate	Type of Inmate
1B1	38	2 man	20.0	Inmate-Workers
1B2	56	2 man	20.0	Inmate-Workers
1C1	49	2 man	20.0	Inmate-Workers
1C2	35	2 man	20.0	Inmate-Workers
2B1	47	2 man	20.0	Recidivists
2B2	45	2 man	20.0	Recidivists
1A1	101	8 man	13.4	Medical & Pro Workers
1A2	76	8 man	13.4	Inmate-Workers
3A2	93	8 man	13.4	Black
		9 man	34.9	Recidivists
1D1	120	12 man	37.5	School
		14 man	26.7	
		24 man	17.7	
3D1	188	12 man	37.2	Black Recidivists
		14 man	26.3	
		24 man	17.7	

As can be seen from Table 6, units with higher numbers of inmates in a cell also tended to have larger numbers of inmates in the unit. Spatial density appears rather independent of social density, with the 8-man cells being least spacious. Black recidivists were housed only in the unit with 188 men, while only the school tank contained 120 people. It is quite clear that any analysis attempting to determine the contribution of housing factors (e.g., social density) needs to take into account the contribution of the other factors.

Results

To evaluate the overall effect of housing type we compared inmates living in four different social densities (2, 8 or 9, 12 or 14, 24). As can be seen these different housing types also varied in spatial density, number of individuals in the unit, and type of unit. While unit population tends to be strongly correlated with social density (r = .77), spatial density is only weakly correlated with these variables. Unit type varies both within and between social density levels.

As can be seen from Table 7, the units with high social density and unit populations were rated more negatively. The main trend appears to be

- - - - - - - - - - - - - - - - - -

Table 7 about here

- - - - - - - - - - - - - - - - - -

for the units with 8 or more inmates per cell to be rated more negatively than the two man cells, with little difference among the 8, 12/14, and 24-man cells. Only in the case of the "too many people rating" is the 24-man cell seen substantially more negative than the rest. Significant (or nearly

Table 7

Effects of Housing Type at Harris County

	Housing Type				
Social Density	2	8	12/14	24	
Unit Population	36/59	82/101	120/188	120/188	
Spatial Density	20	13	26/38	18	
Unit Type	Worker/ Recidivist	Worker/Black Recidivist	School/Black Recidivist	School/Black Recidivist	p-value
Age	27.3	30.7	24.6	24.5	.001
Too Many People[1]	3.9	4.7	4.9	5.9	.01
Noisy[1]	5.1	6.1	6.0	6.2	.05
Poorly Arranged[1]	4.3	5.5	4.7	5.5	.05
Crowded[1]	3.8	5.2	5.1	5.4	.01
Perceived Crowding[1]	1.8	2.8	2.7	2.8	.001
Diastolic	55.1	60.8	51.9	54.2	.06

Note 1: A high score is more negative.

so) effects were also obtained for age and diastolic blood pressure, with inmates in the 8-man cells being older and having higher blood pressures.

The above analysis was also repeated collapsing across the 12/24 social density groups since these are similar in unit type and population. The results were very similar to the four-group analysis, with all of the effects being stronger (Table 8). It should be noted that there were no

- - - - - - - - - - - - - - - - -

Table 8 about here

- - - - - - - - - - - - - - - - -

significant differences among the various housing conditions in time in jail or in the housing condition.

When the adjusted means of too many people, noisy, poorly arranged, crowded and perceived crowding are combined the result is very much like Woodlawn. As can be seen in Figure 2, negative responses are relatively lower for two man cells and sharply higher for 8 through 24 man cells.

- - - - - - - - - - - - - - - - -

Figure 2 about here

- - - - - - - - - - - - - - - - -

Since age varied significantly across housing conditions, analyses of covariance were employed to assess the impact of this variable on our results. In these analyses the ratings effects remained the same, but the blood pressure effect disappeared.

Since type of unit varied within housing condition, the effect of unit type was assessed in conjunction with social density condition (2, 8, 12/24). Workers and school inmates were contrasted with recidivists because these

Table 8

Effects of Housing Type at Harris County

	Housing Type			
Social Density	2	8	12/24	
Unit Population	36/59	82/101	120/188	
Spatial Density	20	13	18/38	
Unit Type	Worker/ Recidivist	Worker/Black Recidivist	School/Black Recidivist	p-value
Age	27.3	30.7	24.5	.001
Too Many People[1]	3.9	4.7	5.5	.01
Too Crowded[1]	3.8	5.2	5.3	.01
Poorly Arranged[1]	4.3	5.5	5.2	.05
Noisy[1]	5.1	6.1	6.1	.01
Perceived Crowding[1]	1.8	2.8	2.8	.001
Systolic	108.6	113.1	105.6	.08
Diastolic	55.1	60.8	53.2	.03

Note 1: High score is more negative.

two groups differed in time spent in their housing unit. The recidivists are in their units most of the day while the workers and school inmates are out of the unit for large portions of the day. The results of this analysis are shown in Table 9.

- - - - - - - - - - - - - - - - - -

Table 9 about here

- - - - - - - - - - - - - - - - - -

In addition to the housing effects observed before, it appears that the recidivists rate their housing more negatively but have lower blood pressures than the other group. These negative ratings may reflect the greater length of confinement for the recidivists or a generally more negative predisposition. The relatively lower blood pressures for the recidivists may reflect their low levels of activity. When age is controlled by analysis of covariance, only the results for diastolic blood pressure were changed. The housing type effect disappeared (as before), as did the effect of unit. However, there remained a relatively strong interaction of unit and housing type, as seen in Table 9. The 8-man cells led to elevated blood pressures only for the recidivists.

The effect of unit type was also assessed by comparing the effects of all four unit types in one-way analysis of covariance. Age, spatial density, social density, and unit population were used as covariates. The results are shown in Table 10, and indicate that the black recidivists feel most crowded, the workers rated the environment least noisy, and the workers had the highest blood pressures. The results for the workers may reflect their involvement in activities outside of their units.

Table 9

Effects of Housing and Unit Classification at Harris County

Housing Type	2 (N = 19)	8 (N = 20)	12/24 (N = 28)	2 (N = 19)	8 (N = 14)	12/24 (N = 28)	p value for housing effects	p value for unit effects	p value for interaction
Perceived Crowding[1]	1.7	2.5	2.4	1.9	3.2	3.1	.001	.001	
Too Many People[1]	3.3	4.7	4.7	4.5	4.5	6.2	.01	.02	
Crowded[1]	3.1	5.3	4.6	4.5	5.2	6.0	.001	.01	
Noisy[1]	4.4	5.8	5.8	5.8	6.5	6.4	.01	.01	
Systolic	115.4	117.5	108.3	103.7	107.1	103.4		.01	
Diastolic	57.1	57.6	56.0	53.7	65.8	50.8	.03		.06
(Adjusted for age)	57.6	55.1	58.2	52.8	65.0	51.0			.01
Age	25.9	32.2	22.5	28.8	28.7	26.5	.001		.05

Note 1: A high score is more negative.

Table 10

The Effect of Unit Classification at Harris County

Measures	Unit Type				p-value
	Worker (N = 41)	Recidivist (N = 19)	Black Recidivist (N = 45)	School (N = 30)	
Perceived Crowding	2.07	1.94	3.15	2.34	.01
Noisy	4.92	5.79	5.48	5.82	.05
Systolic	116.40	103.72	105.26	107.91	.01

Note: These scores are adjusted for covariates. Higher scale values are more negative.

- - - - - - - - - - - - - - - -

Table 10 about here

- - - - - - - - - - - - - - - -

Similar results are obtained when one compares workers and recidivists in the two man cells. This is the only housing condition where such a comparison of unit type is possible. As seen in Table 11, workers rate their environment as less crowded and noisy but have higher systolic blood pressures in comparison with recidivists.

- - - - - - - - - - - - - - - -

Table 11 about here

- - - - - - - - - - - - - - - -

To determine more precisely the contributions of social density, spatial density, and unit population to the observed effects of housing, the multiple regression approach was employed. Additional independent variables used in this analysis were age and type of unit. Since unit type is a nominal-scale variable, a dummy coding procedure was used for this variable. Age was entered in the analysis first to control for the effect of this variable. The other dependent variables were then entered simultaneously. Because social density and unit population were highly correlated ($r = .77$), the simultaneous use of these two variables in the analysis could lead to misleading results. This problem of multicollinearity is discussed in Darlington (1968). To deal with this problem, social density and unit population were entered in two separate analyses. The results of these two analyses were quite similar and are shown in Tables 12 and 13.

Table 11

Workers and Recidivists in Two-Man Cells

Measures	Workers (N = 19)	Recidivists (N = 19)	p-value
Crowded[1]	3.1	4.5	.05
Noisy[1]	4.4	5.8	.05
Systolic	115.4	103.7	.05

Note 1: Higher values are more negative.

Table 12

Results of Regression Analyses Using Social and

Spatial Density as Predictor Variables

Dependent Variables	Predictor Variables: Social Density Beta	Social Density p-value	Spatial Density Beta	Spatial Density p-value
Perceived Crowding	.33	.03	-.28	.04
Too Many People	.49	.004	-.27	.07
Crowded	.43	.008	-.29	.04
Poorly Arranged	.53	.002	-.39	.01
Medical Complaints			.78	.001

Note: Age and unit were also entered as predictor variables.

Table 13

Results of Regression Analysis Using Unit Population and Spatial Density as Predictor Variables

Dependent Variables	Predictor Variables: Unit Population Beta	Unit Population p-value	Spatial Density Beta	Spatial Density p-value
Perceived Crowding	.47	.05	-.45	.04
Too Many People	.64	.02	-.47	.05
Crowded	.71	.004	-.60	.009
Poorly Arranged	.85	.002	-.74	.003
Diastolic			.47	.07
Medical Complaints			1.06	.004

Note: Age and unit type were also entered as predictor variables.

- - - - - - - - - - - - - - - - - - - -

Tables 12 and 13 about here

- - - - - - - - - - - - - - - - - - - -

For ratings of the environment, both social and spatial density contributed significantly, with spatial density a somewhat weaker predictor. For medical complaints occurring after six weeks in jail, only spatial density was a significant factor. For the analysis with unit population, spatial density was a marginally significant predictor of diastolic blood pressure. It should be noted that higher levels of space were associated with higher blood pressure and level of medical complaints.

Conclusions

This study has demonstrated that research on overcrowding in jails is feasible. We found the jail administrations, personnel, and inmates to be very cooperative. Although facilities for data collection are often limited, sufficient accomodations were found. The main problem we encountered was finding housing variations that were not completely confounded by assignment or classification. Our experience suggests that considerable exploration of a variety of jail environments should be a part of any future research on crowding in jails.

Consistent with our prison research, both social and spatial density contribute to the evaluation of crowded environments, with the effects of space being somewhat weaker. Interestingly, while spatial density was not a significant independent predictor in relatively spacious Woodlawn, it was a significant predictor in spatially dense Harris County Detention Center. This pattern of results supports our earlier suggestions that space will

become a relatively more important factor when it reaches sufficiently low levels (McCain et al., 1980). Our findings at spatially dense Stateville Penitentiary also led us to similar conclusions (Paulus et al., 1978).

We did not find any significant effects of housing type on illness complaint rate. This measure has been strongly related to crowding in our prison studies. The relatively short stays are not sufficient to build up the substantial medical histories required for an adequate assessment of crowding effects. In our prison research, the most stable findings were those for the period of time after the inmate had been at least six weeks in a particular housing unit.

While blood pressure was not related to housing type in the Dallas or Woodlawn facilities, recidivists housed in the spatially dense 8-man cells at Harris had elevated diastolic blood pressures. This finding is consistent with that obtained from spatially dense multiple occupant cells at Stateville Prison (Paulus et al., 1978).

Inmate classification also contributed to our dependent measures. Generally those who were confined to their housing rated their housing more negatively. Yet those who were allowed to be involved in activities outside of their units had elevated blood pressures. In the case of Dallas County, units with violent inmates led to relatively more negative reactions. It is clear from these results that classifications need to be taken into consideration in any study of jail crowding.

Reference Notes

Attorney General's Task Force on Violent Crime: Final Report, August, 1981, U.S. Department of Justice.

Bureau of Justice Statistics Bulletin, September, 1981. Prisoners at Midyear 1981.

McCain, G., Cox, V. & Paulus, P. The Effect of Prison Crowding on Inmate Behavior. National Institute of Justice, Washington, D.C. 1980.

McCain, G., Cox, V., Paulus, P. & Karlovac, M. Social Disorganization as a Critical Factor in "Crowding". Midwestern Psychological Association Convention, 1981.

McCain, G., Cox, V., Paulus, P., Luke, A. & Abadzi, H. The effects of reduction of crowding in a school environment. Submitted for publication, 1982.

References

Baum, A. & Valins, S. Architecture and social behavior: Psychological studies in social density. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Cohen, S., Glass, D.C. & Phillips, S. Environment and health. In H.G. Freeman, S. Levine & L.G. Reeder (Eds.), Handbook of medical sociology. Englewood Cliffs, N.J.: Prentice Hall, 1977.

Cox, V., Paulus, P., McCain, G. & Karlovac, M. The relationship between crowding and health. In A. Baum & J. Singer (Eds.), Advances in environmental psychology. Hillsdale, N.J.: Lawrence Erlbaum Associates, in press.

D'Atri, D.A. & Ostfeld, A.M. Crowding: Its effects on the elevation of blood pressure in a prison setting. Preventive Medicine, 1975, 4, 550-560.

Dean, L.M., Pugh, W.M. & Gunderson, E.K.E. The behavioral effects of crowding: Definitions and methods. Environment and Behavior, 1978, 21, 79-83.

McCain, G., Cox, V. & Paulus, P. The relationship between illness complaints and degree of crowding in a prison environment. Environment and Behavior, 1976, 8, 283-290.

Paulus, P., McCain, G. & Cox, V. Death rates, psychiatric committments, blood pressure and perceived crowding as a function of institutional crowding. Environmental Psychology and Nonverbal Behavior, 1978, 3, 107-116.

APPENDIX A

Informed Consent Form

This study is being conducted by Drs. Paul Paulus and Garvin McCain who are psychologists from The University of Texas at Arlington. The study is designed to determine the best kind of housing for a jail setting. One objective is to obtain information which can be used in institutional design. We would like you to take a brief questionnaire. We would also like to obtain a blood pressure reading as an index of your physiological response to your housing. In addition we would like your permission to examine some of your records, including medical records. Participation in this study will involve no discomfort or risk.

I understand the purpose of the study as explained above, and I consent to participate in the study and to permit the institutional staff to release the information in my records, including medical records, to the researchers for the purposes of the study. My consent is voluntary and I understand that all information will be handled in the strictest confidence and that my participation will not be individually identifiable in any reports. I further understand that there is no penalty or prejudice of any kind for not participating in the study.

_____ _____ _____

(Signature) (Register No.) (Date)

_____ _____

(Witness) (Date)

APPENDIX B

Key Punch Column

Name _____ Number _____ (1 - 8)

Age _____ (9 - 10)

Height _____ (11 - 13)

Weight _____ (14 - 16)

How many people are in your room or cell? _____ (18 - 19)

How long have you been in this room or cell? (in weeks) _____ (20 - 22)

How long have you been in this jail this time? (in weeks) ____ (23 - 25)

Are you presently having trouble sleeping?

Never ____; Occasionally ____; Often ____ (26)

Have you had headaches since you came to the jail?

Never ____; Occasionally ____; Often ____ (27)

While you were growing up, how many people, including yourself, lived in your house? _____ (28 - 29)

What are some things that bother you most about your housing conditions? (list up to three)

_____ (30)

_____ (31)

_____ (32)

If you had to choose, what would you say bothers you most, too many people in your cell or too little space in your cell. Check one.

Too many people _____ (33)

Too little space _____

APPENDIX B (cont'd)

In this questionnaire you will be asked to use several rating scales. Below is an example of how these scales are used. This particular example involves rating today's weather.

Example: Today's Weather

Good ____ X ____: ____: ____ ____ ____ Bad

Cold ____ ____ ____: X : ____ ____ ____ Hot

Comfortable ____ ____ ____: ____: ____ ____ X Uncomfortable

In this example someone has checked the blanks to indicate that he thinks that today's weather is pretty good, neither hot nor cold, but very uncomfortable.

All of the questions below will be like the example. The more strongly you feel that the word at one end of the scale (good, cold, etc.) describes how you feel, the closer you should place your check mark toward that end of the scale.

Key Punch Column

The room, cubicle, cell, or dormitory in which you live.

Good	____:____:____:____:____:____:____	Bad	(34)
Unattractive	____:____:____:____:____:____:____	Attractive	(35)
Right Number of People	____:____:____:____:____:____:____	Too Many People	(36)
Unpleasant	____:____:____:____:____:____:____	Pleasant	(37)
Uncrowded	____:____:____:____:____:____:____	Very Crowded	(38)
Well Arranged	____:____:____:____:____:____:____	Poorly Arranged	(39)
Uncomfortable	____:____:____:____:____:____:____	Comfortable	(40)
Quiet	____:____:____:____:____:____:____	Noisy	(41)

APPENDIX B (cont'd)

Name _____ No. _____ Key Punch Column

In your present cell or room you feel:

Uncrowded _____; Moderately crowded _____; Crowded _____;

Very crowded _____. (42)

What kind of medicine are you taking now?

_____

None

Blood Pressure: Systolic _____ (43 - 45)

Diastolic _____ (46 - 48)

Medical History: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Housing History: _____

_____

_____

END