

# Household Crowding and Social Support: A Quasiexperimental Analysis

Gary W. Evans and Stephen J. Lepore

People often cope with crowded living conditions by socially withdrawing from their housemates. This coping strategy may overgeneralize, influencing social interactions with others outside the home. In a stressful laboratory situation, Ss from crowded homes, in comparison with uncrowded counterparts, are less likely to seek support from a confederate and rate the confederate as less supportive. Moreover, Ss from crowded homes are less likely to offer support to a confederate in need. These differences in social interaction behaviors appear to be attributable to crowded residents' social withdrawal.

In two recent field studies, we uncovered evidence of links between household crowding and psychological distress. Higher residential crowding was associated with greater psychological distress among poor, male heads of household in India in an initial cross-sectional study, after socioeconomic status was statistically adjusted for (Evans, Palsane, Lepore, & Martin, 1989). These findings were replicated in a prospective study of middle class American male and female college students that included statistical controls for initial levels of psychological distress (Lepore, Evans, & Schneider, 1991). The replication study also demonstrated that at the time of initial occupancy, residential density was unrelated to levels of psychological distress.

A variety of mechanisms have been proposed to explain the negative psychological effects of crowding on humans (Baum & Paulus, 1987; Evans & Lepore, 1992). The present article focuses on one of these mechanisms: the disruption of socially supportive relationships. Chronic crowding is associated with lowered levels of perceived social support (Evans et al., 1989; Lakey, 1989; Lepore et al., 1991), and low levels of perceived social support can be a risk factor for psychological distress (Vaux, 1988; Wethington & Kessler, 1986). Therefore, perceived social support is, hypothetically, a plausible mediating variable that could help explain the relation between chronic household crowding and psychological distress.

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Several strands of evidence suggest that chronic residential crowding can disrupt social relationships in general and social support specifically. First, residents of overcrowded prisons (Cox, Paulus, & McCain, 1984), dormitories (Baum & Valins, 1977, 1979), and homes (Gove & Hughes, 1983; Saegert, 1982) have reported excessive, unwanted social interactions. Second, crowded adults and children reveal overt symptoms of social withdrawal including reductions in social interaction, reduced eye contact, and more solitary play among children (Aiello, Thompson, & Baum, 1984; Baum & Paulus, 1987; Evans, 1978). Third, Evans et al. (1989) and Lepore et al. (1991) uncovered negative correlations between chronic household crowding and perceptions of social support from housemates.

There is also evidence that through its negative effects on perceived social support, chronic household crowding increases psychological distress. In both a cross-sectional and a prospective, longitudinal analysis, the significant, positive correlation between residential density and psychological distress became nonsignificant when the covariation between psychological distress and social support was partialled out of the respective regression equations (Evans et al., 1989; Lepore et al., 1991).

The mechanism by which crowding interferes with social support, however, is not clearly understood. One possible explanation is that people living under crowded conditions may cope with the surfeit of unwanted social stimulation by withdrawing from their housemates. High-density situations may create an overload of social stimuli for several reasons. They may place too many unwanted social demands on people. Not only is more social interaction unavoidable, it may also create unpredictability (Saegert, 1978). This unpredictability may, in turn, heighten feelings of low control over the home environment (Lepore, Evans, & Schneider, 1992). Another consequence of overload from crowding may be reduced attentional capacity (S. Cohen, 1978). The stress caused by the demands of high-density situations may render individuals less able to pay attention to information, including social cues.

One way to cope with social stimulus overload is to socially withdraw. Milgram (1970), for example, argued that urbanites in comparison with persons living in rural and suburban areas adapted to the stimulus overload environment of cities by a combination of strategies that served to reduce social inputs.

Among these strategies were less allocation of time to each social input, ignoring or filtering out of low-priority social inputs, and establishing various institutions and practices to reduce the amounts of social demands that people must respond to (see Krupat, 1985, for a review of evidence on Milgram's overload model of urban experience). Individuals may withdraw from social interaction as a method of coping with fatigue or residual arousal accompanying stressful encounters (Repetti, 1991). Withdrawal may assist in recovery from short-term stressful experiences by allowing individuals to regain energy. However, when social withdrawal is used as a long-term strategy for coping with chronic stressors, it can create difficulties with interpersonal relationships.

If people socially withdraw as a way to cope with the social overload caused by high-density living conditions, then they might perceive their housemates to be unsupportive. Moreover, as crowded housemates withdraw from one another, they may become less inclined to notice each other's needs or to provide support to one another. The weakening of social bonds among members of crowded households can be conceptualized as an unintended consequence of an adaptive coping mechanism (S. Cohen, Evans, Stokols, & Krantz, 1986; Evans & Cohen, 1987; Schonpflug, 1986). Social withdrawal may help reduce some of the stress accompanying excessive social interaction. However, social withdrawal might cause crowded residents to perceive their housemates as unsupportive. Furthermore, an additional negative consequence of coping with chronic residential crowding could be the overgeneralization of this social withdrawal coping strategy. People in crowded homes may learn to react to others in a more socially withdrawn manner, even when crowded conditions are not present.

In a series of studies, Baum and colleagues have found that residents of long, double-loaded-corridor dormitories in contrast to residents of either suite-designed or short-corridor facilities feel more crowded and report more unwanted social interaction (Baum & Valins, 1977, 1979; Baum, Gatchel, Aiello & Thompson, 1981). Furthermore, when tested under uncrowded laboratory conditions, residents of the long-corridor dormitories were less likely than their suite-design or short-corridor dormitory counterparts to initiate conversation with or sit close to a stranger in a waiting room. In addition, during a group interaction game, residents from long-corridor dormitories were more likely to be withdrawn, whereas those from suite-design or short-corridor dormitories behaved in a more cooperative manner.

The present study builds on and extends both Baum's research on dormitory architecture and crowding as well as our own previous research on residential crowding, social support, and psychological distress. We hypothesized that residents of high-density homes will perceive that less social support is available to them when offered a standardized set of socially supportive behaviors in an uncrowded setting than will residents of low-density homes. Moreover, when provided the opportunity to offer social support to someone in need, residents of high-density in comparison with low-density homes, will be less forthcoming with support. In addition, we tested whether social withdrawal behaviors can explain why residents of high-density homes perceive less social support. Specifically, we hypothesized that during a standardized social support interac-

tion, residents of high-density homes will be more socially withdrawn than their low-density counterparts.

Both self-report and independent observers' ratings of support behaviors are included in the present study. Therefore, a multimethodological assessment of our hypothesis is possible. Previous research on crowding and social support has relied strictly on self-report indices (Evans et al., 1989; Lakey, 1989; Lepore et al., 1991). Although Baum and colleagues examined behavioral indexes of social withdrawal, they did not measure either subjective or objective indicators of social support. Furthermore, the independent variable in their studies was dormitory architecture, not an objective index of density such as persons per room, which is used in the present study. Finally, because our sample is drawn from a subsequent wave of a prospective, longitudinal survey study, we can examine whether self-selection with respect to either social support or psychological distress occurred in high-density versus low-density households at the time of initial occupancy.

## Method

### Subjects

Participants were 72 college students living in off-campus apartments (39 women and 33 men). They were drawn from the upper and lower quartiles of residential density ( $M$  high density = 1.43 people per room;  $M$  low density = .74 people per room) of the sample from our earlier study of college students (Lepore et al., 1991). Subjects received \$20 for their participation in the laboratory study. The racial distribution of the sample was 59% Caucasian, 25% Asian-American, 12% Chicano-Latino, 3% African-American, and 1% other. The average age of participants was 20 years ( $SD = 2.3$  years), with an average monthly income of \$689 ( $SD = \$325$ ).

At the time of the laboratory experiment, participants had been living in their apartments for approximately 8 months ( $SD = 11$  days). They were informed that the study was on the quality of social relationships in off-campus housing. None of the participants were aware of the specific hypotheses of the study or of our interest in crowding.

### Procedure

The study was conducted in a 4.27-m  $\times$  2.74-m room. One side of the room was bounded by a one-way mirror. The room contained a table with reading magazines on it, two chairs, and an automated blood pressure machine. Participants were informed that an experimenter would be videotaping their behaviors as they and another participant interacted. Only the subject and a same-gender confederate were in the room during measurement periods. The confederate and the experimenter were blind to subjects' residential density condition.

On arrival, the subject and the confederate provided written informed consent and then each wrote a 5-min essay on their opinions about political changes in the Soviet Union. The subject and confederate then participated in a 5-min social interaction. The major purpose of this interaction period was to establish rapport between the subject and confederate before the social support manipulation described below. The subject was asked to begin talking about the people with whom she or he lived. The confederate was trained to be responsive and engaging with the subject. At a set point, the confederate shifted the conversation to friends the subject had outside of the residence.

Following the social interaction period, the confederate and the sub-

ject had their blood pressures taken over a period of 10 min.<sup>1</sup> Next, the manipulated social support interaction began. The social support interaction had two phases. The purpose of the first phase was to measure subject's reactions to objective offers of social support after a mild stressor. Stress was induced by giving bogus feedback on the subject's and confederate's essays on Soviet politics. Pilot data indicated that this negative feedback on a writing sample was perceived as stressful by college students both in absolute terms and in comparison with the situation when positive feedback was received. Essay scores were read aloud by the experimenter: The confederate received a 90 out of a possible 100, which was an A-, whereas the subject only received a 79, a C+. When grades were read, subscores were also given for originality, organization, and persuasiveness. The experimenter then asked the participants to wait a few minutes while she or he went into the next room to prepare for another part of the experiment.

Half of the subjects (random assignment within density levels) then received a verbal communication of social support from the confederate ("That's a bummer. They really didn't give us much time."). In this support condition, the confederate responded warmly to the subject's comments with supportive reactions and nonverbal gestures (e.g., smiling). After approximately 60 s, the supportive confederate added, "Don't feel bad—you got a perfect score on originality." Confederates in the no-support condition did not initiate conversation and only responded briefly, but appropriately, to any remarks made by the subject. The nonsupportive confederate made no direct comments of a socially supportive nature but acted in a neutral and polite manner. After the 3-min "waiting" period, the experimenter returned to the room and administered self-report rating scales. The subject privately rated the confederate's supportiveness while the confederate privately rated support seeking by the subject.

To begin the second phase of the social support interaction, the participant and the confederate each wrote a second essay on the destruction of the Berlin Wall. Blood pressure was monitored for 10 min after the completion of this second essay. After the blood pressure readings, the second social support interaction period began. The experimenter returned and announced the participants' grades on the second essay. This time the confederate received 79 points out of 100, a C+, whereas the subject received 92 points, an A-.<sup>2</sup> The experimenter then left the participants alone for 3 min, supposedly to prepare for the next part of the study. The purpose of this second social support interaction was to observe the extent to which subjects would be socially supportive to the confederate. On returning to the room, the experimenter debriefed the subject. The confederate then "left" and immediately rated how supportive the subject had been to him or her during the 3-min waiting period after the feedback on the second essay. The order of the two social support scenarios was fixed so that the session would end on a positive note for the subject.

## Measures

Three types of data were collected in the laboratory: subject's self-reports, confederate's ratings, and observer's ratings of videotaped behaviors of the subject during social interaction (i.e., waiting periods) with the confederate. All observers were blind to the subject's residential crowding condition. In addition, some survey data from an interview conducted 8 months earlier, at the time of the subject's initial occupancy, are presented to help refute a self-selection alternative hypothesis.

**Survey.** At the time of initial occupancy (less than 2 weeks of occupancy), a telephone interview was conducted with subjects that included sociodemographic information and measures of psychological distress and perceived social support. See Lepore et al. (1991) for more details on the telephone interview procedures. Psychological distress was measured by the Demoralization Index of the Psychiatric Epidemiological Research Instrument (PERI; Dohrenwend, Shrout, Egri, &

Mendelsohn, 1980). Perceived social support was measured with a modified version of the Social Support Appraisal Scale (Vaux & Harrison, 1985; Vaux et al., 1986). As discussed in Lepore et al. (1991), each of these scales is well validated and highly reliable.

**Self-report.** In the initial phase of the social support interaction, the subject rated the confederate's supportiveness. The ratings of supportiveness were made on a six-item, 7-point, bipolar adjective scale (e.g., *supportive-unsupportive, close-distant*; Cronbach  $\alpha = .78$ ).

**Confederate ratings.** The confederate rated subjects' support seeking after the first social support phase on a one-item index ranging from 1 = *the subject did not seek support at all* to 7 = *extreme support seeking*. After the second social support phase, the confederate rated the subject's supportiveness using the same six-item rating scale described above.

**Observations.** Different sets of trained observers timed the duration (seconds) subjects read magazines (Ebel  $r = .99$ ) and rated the overall levels of social withdrawal of subjects (0 = *engaged and interactive*, 1 = *minimally engaged, but distant*; and 2 = *withdrawn, ignored confederate*; Ebel  $r = .97$ ), during each of the 3-min social support interaction phases. In the first interaction phase for the subset of subjects to whom social support has been offered, the subject's responsiveness to the confederate's offer of support was also rated (0 = *not responsive, ignored confederate* [i.e., did not look at confederate, no verbal acknowledgment]; 1 = *minimal acknowledgment, brief comment, head nod*; 2 = *very responsive, elaborated and embellished*; Ebel  $r = .76$ ). In the second social support interaction period, observers rated how supportive the subject was to the confederate (Ebel  $r = .96$ ) (0 = *subject said nothing*; 1 = *subject made small talk, friendly chitchat but no direct offer of support*; 2 = *subject made direct expressions of concern, belittled task, or offered advice about the task*).

## Results

### Analytic Strategy

Our analytic strategy was designed to address two principal questions. First, are residents of high-density homes in comparison with their low-density counterparts less responsive to offers of social support? In addition, are they less forthcoming with provision of support when another person is in need? Second, are these differences in social support behaviors the result of heightened social withdrawal on the part of more crowded residents?

The results are organized into three subsections. First, survey data test for possible self-selection into crowded versus uncrowded residences. Second, we analyze whether crowded residents were less likely than uncrowded residents to perceive the confederate as socially supportive and to provide social support to the confederate when he or she was in need. Third, we examine whether social withdrawal functions as an explanatory process to account for group differences in perceived and provided social support.

<sup>1</sup> Because we do not have measures of resting blood pressure and because the blood pressure measures were taken after the social interaction period, we have insufficient sensitivity to properly interpret the blood pressure data. Thus the blood pressure results will be combined with another psychophysiological and crowding data set and reported in a future article. They are not included here.

<sup>2</sup> Feedback to the subject on his or her first and second essays, respectively, was 33 and 33 for originality, 22 and 29 for organization, and 24 and 30 for persuasion. The confederate's feedback was similar but in the reverse order on the two essays.

Because none of the interactions of social support and residential crowding were statistically significant, overall means for social support from the confederate (present-absent) and for residential crowding (high-low), respectively, are presented.<sup>3</sup>

### Selection

We used *t* tests to investigate whether there was systematic self-selection into high- versus low-density residences. At the onset of residential occupancy, there was no significant difference in psychological distress (PERI) as a function of residential density condition,  $t(71) = 1.21$ , *ns*. Residential density at initial occupancy also did not affect perceived social support from roommates,  $t(71) = 1.26$ , *ns*. There was a significant difference in income between high- and low-density residents,  $t(71) = 2.75$ ,  $p < .01$ . However, further analyses revealed no association between income and any of the dependent measures reported below, precluding the need for statistical control of income in subsequent analyses.<sup>4</sup>

### Social Support

To examine differences in social support behaviors between residents of crowded versus uncrowded homes, we compared using analysis of variance (ANOVA) the main and interactive effects of residential density (crowded vs. uncrowded) and the experimental social support manipulation (support vs. no support provided by the confederate) on subjects' support seeking and perceived support from the confederate (Social Support Phase 1) and provisions of support to the confederate (Social Support Phase 2).

As shown in Table 1, after receiving feedback on a task (Social Support Phase 1), residents of crowded homes were marginally less likely to seek support from a confederate than were their uncrowded counterparts,  $F(1, 71) = 2.89$ ,  $p < .09$ . There was no main effect of the confederate's social support offer,  $F(1, 71) < 1.0$ , on support seeking behavior by the subject (support  $M = 4.94$ , no support  $M = 5.18$ ). Residents of crowded homes also perceived that less support was offered to them by the confederate,  $F(1, 71) = 5.34$ ,  $p < .02$  (see Table 1). Consistent with the manipulation of the confederate's supportive behavior, subjects who interacted with a supportive confederate rated the confederate as significantly more supportive ( $M = 5.01$ ) than did those subjects who interacted with a neutral confederate ( $M = 4.16$ ),  $F(1, 71) = 19.61$ ,  $p < .001$ .

When the confederate was put in a position where he or she apparently needed support (Social Support Phase 2), subjects from crowded homes provided less social support than did subjects from uncrowded homes,  $F(1, 71) = 6.29$ ,  $p < .01$  (see Table 1). There also is evidence of reciprocity of support. Subjects who had received social support in the first support interaction phase were more likely ( $M = 5.19$ ) than those who had not received support in the first support interaction phase ( $M = 4.16$ ) to offer support to the confederate when he or she appeared to need it during the second social support interaction phase,  $F(1, 71) = 19.60$ ,  $p < .001$ . Consistent with the confederates' ratings of subjects' behaviors, observers rated subjects from crowded homes versus uncrowded homes as significantly less supportive in their actions toward the confederate,  $F(1, 71)$

$= 4.11$ ,  $p < .05$ , during the second social support interaction phase (see Table 1). Evidence of reciprocity was evident as well in the observers' ratings. Subjects who had received support in the initial phase were rated by observers as significantly more supportive ( $M = .95$ ) than those who had not received support ( $M = .73$ ),  $F(1, 71) = 6.74$ ,  $p < .01$ .

In summary, residents from crowded households in comparison with their uncrowded counterparts were marginally less likely to seek support immediately after receiving negative feedback on an essay-writing task, perceived that significantly less social support was available to them from a confederate, and were significantly less forthcoming with social support for the confederate when the confederate had received negative feedback on a second essay-writing task.

### Explanatory Processes

We used two analytic strategies to address whether social withdrawal is an explanatory mechanism that may partially account for crowded residents' poorer social support skills. First, we used ANOVA to examine whether residential density (crowded vs. uncrowded) and the social support experimental manipulation (support vs. no support offered by confederate) affected social withdrawal. Second, to more directly address whether social withdrawal could function as a mediating mechanism, explaining the link between residential crowding and social support, a series of regression equations was calculated (Baron & Kenny, 1986). For each set of equations, the initial regression analysis regressed the subject's social support behavior (perception of support received from the confederate or offer of support given to the confederate) onto residential density. In Equation 2, we regressed social support behavior onto the hypothetical mediator (social withdrawal). In the final equation within each set of regression equations, we repeated the first equation, except social withdrawal was forced into the equation before household crowding. The mediating role of social withdrawal would be indicated by the previously significant negative association between crowding and social support behaviors (Equation 1) becoming nonsignificant as a result of partialing out the effects of social withdrawal (Equation 3).

During the initial interaction, after subjects had received negative essay feedback (Social Support Phase 1), subjects from crowded homes in comparison with subjects from uncrowded homes read magazines for a substantially greater amount of time,  $F(1, 71) = 12.68$ ,  $p < .001$ , and were rated by observers as more socially withdrawn,  $F(1, 71) = 3.91$ ,  $p < .05$  (see Table 2). As shown in Figure 1, subjects from crowded homes were also rated by observers to be much less responsive to the confederate when support was offered,  $\chi^2(2, N = 38) = 10.61$ ,  $p < .005$ .

Subjects in the support condition read magazines for significantly less time ( $M = 19$  s) than those who had not received support from the confederate ( $M = 26$  s),  $F(1, 71) = 12.61$ ,  $p < .001$ . There was also a significant effect of social support on

<sup>3</sup> We also examined possible interactive effects of gender with residential density and the social support manipulation but found no significant effects.

<sup>4</sup> The inclusion of income as a control variable in the analyses of variance reported below made no difference in the outcomes.

Table 1  
*Household Crowding and Social Support Behaviors*

Dependent variable	Low crowding		High crowding	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
First social support phase				
Support sought by subject <sup>a</sup>	5.41	1.63	4.71	1.84
Perceived support from the confederate <sup>b</sup>	4.80	0.79	4.37	1.04
Second social support phase				
Subject's provision of support to confederate <sup>c</sup>	4.95	1.33	4.39	1.52
Observer ratings of subject's provision of support to the confederate <sup>d</sup>	0.93	0.35	0.76	0.39

<sup>a</sup> Confederates item rating of subject's support seeking. Range from *no support seeking* (1) to *extreme support seeking* (7).

<sup>b</sup> Subject rating scale of perceived support from confederate. Range from *very unsupportive* (1) to *very supportive* (7).

<sup>c</sup> Confederates rating scale of provision of support by subject. Range from *very unsupportive* (1) to *very supportive* (7).

<sup>d</sup> Observation code range from *none* (0) to *direct expression of support* (2).

observers' ratings of social withdrawal (support  $M = .54$  vs. no support  $M = 1.03$ ),  $F(1, 71) = 13.41, p < .001$ .

After the period in which the confederate received negative essay feedback (Social Support Phase 2), subjects from crowded homes again read magazines for a longer duration,  $F(1, 71) = 12.96, p < .001$ , and were rated by observers as more socially withdrawn than their uncrowded peers,  $F(1, 71) = 5.29, p < .02$  (see Table 2). There were no effects of support,  $F(1, 71) < 1.0$ , on the duration of reading magazines (support  $M = 53$  s; no support  $M = 62$  s), but observers rated supported subjects as less socially withdrawn than nonsupported subjects (support  $M = 1.22$  vs. no support  $M = .93$ ),  $F(1, 71) = 3.99, p < .05$ .

Table 3 presents the zero-order correlation matrix for the variables used in the regression analyses to be reported below. Consistent with the means presented in Tables 1 and 2, the matrix reveals that higher levels of household crowding were associated with lower levels of support seeking, perceived support, and support provision by subjects in the laboratory setting. In addition, higher levels of household crowding were associated with higher levels of social withdrawal in the laboratory setting. Greater social withdrawal, in turn, tended to be

Table 2  
*Household Crowding and Social Withdrawal Explanatory Processes*

Dependent variable	Low crowding		High crowding	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
First social support phase				
Reading magazines <sup>a</sup>	8	9	37	16
Social withdrawal <sup>b</sup>	0.65	0.59	0.92	0.64
Second social support phase				
Reading magazines <sup>a</sup>	26	45	89	61
Social withdrawal <sup>b</sup>	0.88	0.67	1.27	0.60

<sup>a</sup> Amount of time (seconds) with possible range of 0–180.

<sup>b</sup> Observation code range from *engaged and interactive* (0) to *withdrawn, ignored confederate* (2).

associated with poorer social support skills. In the following regression analyses, we directly test whether social withdrawal mediates the relations between household crowding and social support behaviors.

The regression results of predicting social support behaviors from residential crowding, social withdrawal, and from residential crowding after partialing out the effects of social withdrawal are presented in Table 4. Residential crowding was a significant predictor of negative (lower) levels of social support (line 1 in Table 4).<sup>5</sup> Observers' ratings of social withdrawal were also a significant predictor of perceived social support (line 2 in Table 4). The third regression equation is of particular interest to our hypothesis that social withdrawal is an explanatory mechanism linking the association between residential density and perceived social support. In this regression (line 3 of Table 4), the initial regression of perceived social support onto residential density is repeated but with the effects of social withdrawal partialled out of the equation. The previously significant relation between perceived social support and residential crowding is no longer significant when the covariation between social withdrawal and perceived social support is removed.<sup>6</sup>

Using a mediation analysis parallel to the one illustrated in Table 4, we examined whether observers' ratings of social withdrawal explained the relation between residential density and

<sup>5</sup> The ANOVA results and the multiple regression with density dummy coded are mathematically equivalent (J. Cohen & Cohen, 1983). We are showing each step of the regression analyses to help illustrate the logic of the analysis for a mediating mechanism (Baron & Kenny, 1986).

<sup>6</sup> As a partial test for spuriousness, the density and social withdrawal terms were entered in reverse order in the regression equation. If a third, unspecified variable accounted for the effects of density and social withdrawal, reversing the terms should not have affected the results of the regression analysis. However, reversing the terms of the equation did significantly alter the results. Specifically, social withdrawal had a significant effect on perceived social support after the effects of density were partialled out. These results do not support the alternative hypothesis of spuriousness.

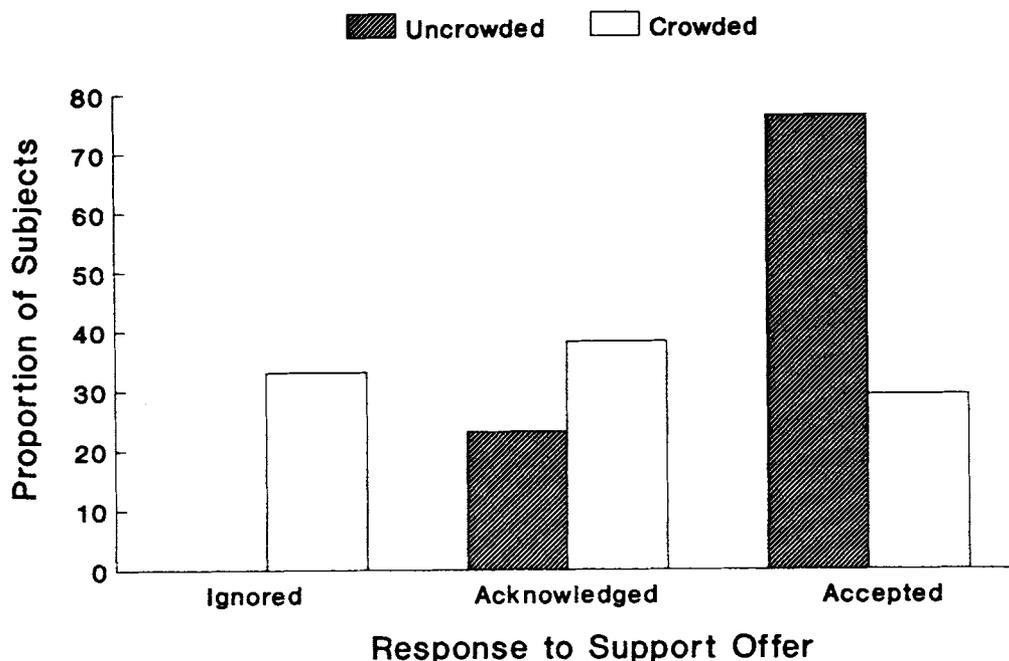


Figure 1. Proportion of crowded and uncrowded residents who ignored, acknowledged, or accepted confederate's social support.

the subject's provision of support to the confederate after negative feedback to the confederate on the second essay (Social Support Phase 2). The results of this analysis are shown in Table 5.

As can be seen in Table 5, residential density is negatively related to the subject's provision of support to the confederate (line 1 of Table 5); provision of support is negatively related to observer ratings of social withdrawal (line 2, Table 5); and withdrawal appears to mediate the relation between residential density and provision of support to the confederate (line 3, Table 5).<sup>7</sup>

In summary, residents from crowded homes manifested greater social withdrawal in comparison with residents from relatively uncrowded homes. This was evidenced by observers' ratings of social withdrawal, by the duration of reading magazines during social interaction periods, and in the responsiveness of subjects to a socially supportive confederate. Furthermore, the relations between household crowding and social support appear to be mediated by social withdrawal. The significant associations between household density and subjects' perceived support from confederates and confederates' perceived support provision from subjects, respectively, became nonsignificant when the effects of social withdrawal were partialled out.

## Discussion

### *Social Support Behaviors*

Residents from crowded households appeared less responsive to socially supportive interactions than those living in uncrowded households. In comparison with uncrowded resi-

dents, those from crowded households sought less social support and, when support was offered, perceived that less social support was available to them. When subsequently exposed to another person in need of support, social support was less forthcoming from individuals who lived in crowded homes than from those living in uncrowded homes. It bears repeating that survey results indicated that individuals from crowded homes did not differ from their low-density counterparts at initial occupancy in levels of perceived social support from their respective housemates.

Thus, the negative effects of residential density on social support (Evans et al., 1989; Lepore et al., 1991) appear to generalize outside the residence. When placed in a noncrowded situation with strangers, people from crowded households appear to be less sensitive to offers of social support. They are also less likely than persons from low-density homes to provide support to another individual in need of support. These findings are consistent with and extend previous work by Baum and colleagues (Baum & Valins, 1977, 1979; Baum et al., 1981), who found that residents of long-corridor dormitories sat further away, initiated conversation less often, had less eye contact, and tended to be less cooperative with a stranger in a laboratory setting than did their counterparts from suite-design or short-corridor dormitories. Our data also fit with previous research showing that residents of large high-rise buildings feel more detached and alienated, know fewer people to say hello to or whom they can count on for assistance, are less socially active

<sup>7</sup> The same test for spuriousness was conducted as in Footnote 6. Again, the results do not support the alternative hypothesis of spuriousness.

Table 3  
Zero-Order Correlation Matrix

Variable	2	3	4	5	6	7	8	9
1. Household crowding	-.18	-.23*	-.22*	-.21*	.38*	.19*	.34*	.28*
Social support behaviors								
2. Phase 1 C rating of S support seeking	—	-.05	-.19*	-.22*	.01	-.01	.16	.14
3. Phase 1 S rating of perceived support from C		—	.48*	.36*	-.17	-.42*	-.09	-.39*
4. Phase 2 C rating of perceived support from S			—	.64*	-.42*	-.48*	-.35*	-.64*
5. Phase 2 O ratings of S provision of support to C				—	-.39*	-.41*	-.36*	-.83*
Social withdrawal explanatory processes								
6. Phase 1 duration of reading magazines					—	.44*	.37*	.39*
7. Phase 1 O ratings of S social withdrawal						—	.28*	.61*
8. Phase 2 duration of reading magazines							—	.47*
9. Phase 2 O ratings of S social withdrawal								—

Note. Phase 1 = first social support phase; Phase 2 = second social support phase; C = confederate; S = self; O = observer.  
\*  $p < .05$ .

with friends and relatives, and belong to fewer voluntary organizations in comparison with residents of smaller, low-rise apartments (McCarthy & Saegert, 1979).

### Explanatory Processes

We believe that the impaired social support skills of residents of crowded homes may reflect an unintended consequence of coping with social overload. People may develop a coping strategy under chronically crowded living conditions of socially withdrawing from housemates. On the one hand, this strategy may be adaptive because it minimizes unwanted social interactions, which are a prominent feature of crowded settings (Baum & Valins, 1979; Saegert, 1981). On the other hand, this coping strategy may become overgeneralized and compromise social relationships (S. Cohen et al., 1986; Schonpflug, 1986). People chronically exposed to high-density environments may learn to withdraw from others indiscriminately regardless of whether the social interaction is potentially beneficial. To examine the hypothesis that social withdrawal is an explanatory mechanism that might account for the apparent link between residential density and social support, we examined both the associations between residential density and measures of social withdrawal and we performed mediation analyses to determine whether social withdrawal behaviors could account for some of the covariance between density and social support.

Observers' ratings of the overall level of social engagement of the subject with the confederate were conducted both during the period immediately after the subject received negative feed-

back on the essay-writing task (first social support phase) and during the subsequent waiting period after the experimenter gave negative feedback on essay-writing performance to the confederate (second social support phase). During each of these periods of unstructured social interaction, residents who lived in more crowded homes tended to be more socially withdrawn.

The regression analyses provided more direct evidence that the reason why people living in high-density homes perceive and manifest less socially supportive behaviors under controlled conditions in the laboratory is because of social withdrawal. The significant negative associations between residential density and socially supportive behaviors become nonsignificant when the effects of social withdrawal are partialled out. This suggests that social withdrawal is a behavioral mechanism that may help explain why density and social support are significantly related.

This mediation pattern appears robust as well. It holds both under conditions when support was offered to residents of high-density homes as well as when they had the opportunity to provide support to another person. Furthermore, as one might expect from the correlation patterns depicted in Table 3, insertion of an alternative measure of social withdrawal, duration of reading magazines, replicated the hierarchical regression analyses depicted in Table 5. However, the mediation analysis shown in Table 4 (social withdrawal as a mediator between residential density and perceived support from the confederate) did not replicate because the correlation between reading magazines and perceived support was not significant. We have no explanation of this anomaly in our data.

Table 4  
Regression of Subject's Perceived Social Support Onto Residential Density and Observer Ratings of Social Withdrawal

Predictor	Total $R^2$	$F(\text{total } R^2)$	$\Delta R^2$	$F(\Delta R^2)$	$df$	$b$	$SE$ of $b$
Residential density	.05	5.34*	.05	5.34*	1, 71	-3.10	1.34
Social withdrawal	.17	15.17*	.17	15.17*	1, 71	-0.74	0.19
Density with additional control for social withdrawal	.19	8.77*	.02	2.13	2, 70	-2.11	1.44

\*  $p < .05$ .

Table 5  
*Regression of Subject's Provision of Social Support Onto Residential Density and Observer Ratings of Social Withdrawal*

Predictor	Total $R^2$	$F(\text{total } R^2)$	$\Delta R^2$	$F(\Delta R^2)$	$df$	$b$	$SE$ of $b$
Residential density	.05	6.29*	.05	6.29*	1, 71	-3.87	1.53
Social withdrawal	.40	47.50*	.40	47.50*	1, 71	-1.43	0.21
Density with additional control for social withdrawal	.41	23.61*	.01	<1.00	2, 70	-0.83	1.69

\*  $p < .05$ .

Another issue our data begin to address is how chronic residential crowding causes social withdrawal. The observation data on reading magazines (see Table 2) and responsiveness (see Figure 1) during the offering of support from another person suggested that residents of crowded homes were less attentive to others during social interactions. Thus, residents of crowded households may be less responsive to offers of support because they learn to tune out social information. The results shown in Figure 1 seem particularly telling in this regard. Residents from crowded homes tended not to notice or become engaged with another person providing an offer of support. For example, approximately one third of the crowded residents ignored the confederate altogether when he or she was offering support to them. They did not look at or verbally acknowledge the confederate in any manner as the confederate provided an offer of support. None of the uncrowded residents responded in this manner. Instead, all of the uncrowded residents responded to the confederate's offer of support with at least minimal acknowledgement (e.g., brief comment and head nod). Furthermore, nearly three times as many uncrowded (78%) as compared with crowded (27%) residents accepted the confederate's offers of support, elaborating on what the confederate had said.

Moreover, crowded residents appeared to be less cognizant of other people's needs for support. Residents from high-density homes read magazines for a substantially greater amount of time during the unstructured waiting period after the confederate received negative feedback on task performance (see Table 2). A lack of sensitivity to the needs of other people for social support might jeopardize the individual's chances of obtaining future social support when he or she is in need. Other individuals may be less forthcoming with social support to an individual when that person has not provided support in the past.

### Conclusions

We have suggested that the social overload accompanying crowded residential living causes people to adopt a coping strategy of social withdrawal. That strategy becomes overlearned and generalizes to situations outside the crowded residence. This overlearned social withdrawal strategy inhibits the use of appropriate social support skills both under circumstances in which the crowded resident is the recipient of offers of social support as well as when she or he is in a position to provide support to another individual in need. Furthermore, this cost of coping with chronic crowding may occur because residents

of crowded homes learn to indiscriminately tune out social cues.

One viable explanation to compete with this model is that persons react to prolonged residential crowding by becoming more negative in their network orientation (Tolsdorf, 1974). Rather than withdrawing and not noticing the social cues indicative of another person's offer of, or need for social support, crowded residents might actively avoid social interactions because they find them unpleasant. They may also avoid taking advantage of support offers forthcoming from others because of the implicit social contract of expectations for reciprocity of social support.

We believe that the present laboratory study and our two previous field investigations conducted among heads of households in India and among American college students on residential density, social support, and psychological distress (Evans et al., 1989; Lepore et al., 1991) indicate several conclusions. First, people living for at least 8 months in crowded residences suffer greater levels of psychological distress in comparison with their uncrowded counterparts. Second, these higher levels of distress are at least partially accounted for by impaired social support skills. Third, the negative relation between residential crowding and social support appears robust in at least two respects. Most important, it appears to generalize outside the crowded environment. In comparison with college students living in uncrowded conditions, those in crowded homes perceive that an objective offer of support from a stranger in an uncrowded setting is not very supportive. Residents from crowded households are also less likely to provide support to someone in need. The crowding and social support data are also robust in that they have been replicated in two field studies using self-report measures and are now reflected in measures of overt behavioral observations under controlled laboratory conditions. Fourth, we have also uncovered preliminary evidence suggesting that the reason why people from more crowded homes are less adept in social support interactions is because they are more socially withdrawn. People from crowded environments may learn to tune out social stimuli as a way to cope with the chronic negative effects of social overload experienced while living in crowded residences. Clearly this last conclusion is more speculative and in need of further investigation.

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