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AcE-Bs 2011 Bandung

ASEAN Conference on Environment-Behaviour Studies, Savoy Homann Bidakara
Bandung Hotel, Bandung, Indonesia, 15-17 June 2011

Stress and the Contextual Proximity of Residential Factors

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Abstract

Research is mounting showing the link between the built environment, well-being and health. We explored three factors: crowding, housing satisfaction, and neighborhood satisfaction to determine their correlation with housing stress, and in turn correlation with overall level of stress. A Simple Random Sample (SRS) of blocks was generated and a total of 180 residents were sampled. Correlation and regression models were used in the data analysis. Although a direct relationship between the residential environment and the overall level of stress was not found, we did find an indirect connection via stress from the struggle for a better house.

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Keywords: Stress; crowding; residential satisfaction; neighborhood satisfaction

1. Introduction

Based on ecological models of health, research has been mounting showing the link between the built environment, well-being (Sampson, 2003) and both physical and mental health (Perdue, Gostin & Stone, 2003; Fox, Jackson & Barondess, 2003; Jackson, 2003; Srinivasan, O'Fallon & Dearth, 2003; Evans, 2003; Weich, Blanchard, Prince Burton, Erens & Sproston, 2002; Diez & Roux, 2001; Halpern, 1995). Much of these contextual research studies have focused on the effect on health of housing (Muller &

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Tighe, 2007; Saegart, Klitzman, Freudenberg, Cooperman-Mroczeck & Nassar, 2003; Evans, Wells & Moch, 2003) and the neighborhood (Srinivasan, O'Fallon & Deary, 2003; Sampson, 2003; Schulz, William, Israel, Becker, Parker, James & Jackson, 2000). Concomitantly, research has been carried out relating negative health outcomes, particularly mental health, to crowding (Gomez-Jacinto & Hombrados-Mendiata, 2002; Beggs & Siciliano, 2001; Edwards, Fuller, Vorakitphokatorn & Sermsri, 1994; Gove & Hughes, 1983; Saegert, 1978; Booth & Cowell, 1976). Thus, the idea that characteristics of the contextual environment can affect health and psychological processes has been well established (Ulrich, 2002; Evans, 2001). In this paper, we explore the relationship between three levels of contextual proximity and stress. Also, we suggest that the connection between the contextual factors and stress occurs via housing stress, and that it is mediated by the immediacy of the context. Thus, our three factors we explore, crowding, housing satisfaction, and neighborhood satisfaction will correlate with housing stress, which in turn correlates with overall level of stress. And that the effect will be strongest from crowding, followed by housing characteristics, and the neighborhood.

2. Literature Review

One focus of recent research in health inequalities, the population health perspective (see Dunn and Hays, 1999), emphasizes the role of the social environment in shaping health status (Dunn, 2000). Prominent within this focus of research is the idea that one's immediate environment shapes both physical and mental health (Evans, 1994; Frank, 1995; Frank & Mustard, 1994), and that housing and health are connected. For example, "(If the physical environment is capable of influencing mental health, housing quality ought to be a prime candidate for research" (Evans, Chan, Wells & Saltzman, 2000, p. 526). Pathways by which these two are connected have been identified: unhealthy disadvantaged individuals' consequent selection into substandard housing conditions; health care access, particularly of indigent individuals; pathological aspects of the dwelling; and stresses associated with unaffordable or inadequate housing (Dunn, 2000). Within the housing pathology pathways, we find links between mental health issues and housing conditions (Wells & Harris, 2007; Evans, Wells & Moch, 2003; Kearns & Smith, 1993) and crowding (Evans, Chan, Wells, & Saltzman, 2000; Fuller, Edwards, Sermsri & Vorakitphokatorn, 1993; Gabe and Williams, 1993; Gove, Hughes & Galle, 1979; Halpern, 1995; Hopton and Hunt, 1996). Studies on housing, stress and health show a clear pattern of association between housing stressors and psychological distress (Evans, Chan, Wells & Saltzman, 2000; Smith, Smith, Kearns & Abbott, 1993). Because people commonly attribute emotional and social meanings to their housing, "in attributing meanings such as control, refuge, connectedness, continuity, and security to their housing residents create a sense of 'home'...increased psychological and social vulnerability may follow from an impaired ability to perform such acts" (Hartig & Lawrence, 2003, p. 458; see also Bratt, 2002). Evans, Wells & Moch (2003) identify processes that can account for this linkage between housing and psychological well being which include identity, insecurity, social support, parenting, and control. This association is understandable if we recognize the role of housing in the operation of social relations: "housing is a crucial site in the day-to-day life of most individuals for the distribution of wealth, control over life circumstances, and access to social resources, as well as being an important factor in processes of social identity formation, and the establishment and maintenance of social relationships" (Dunn, 2000, p. 352).

Numerous studies (Gray, 2001; Evans, Chan, Wells & Saltzman, 2000; Gove & Hughes, 1983) on housing-related stress have demonstrated the importance of crowding and its significant psychological impact (Mueller & Tighe, 2007; Evans, Chan, Wells & Saltzman, 2000). This highlights the immediacy of our living environment as an important source of potential stress. In addition, Kearns & Smith (1994) suggest residential satisfaction goes beyond the house -- i.e., it comprises more than satisfaction with

one's house or dwelling. "(T)he social and physical context in which housing is located may alter its impact on human beings...poorer quality housing is more strongly related to psychological symptoms in adults when housing is located in more deteriorated neighborhoods" (Evans, Wells & Moch, 2003, p. 491) (see also Kasl, Will, White & Marcuse 1982; McCarthy, Byrne, Harrison & Keithley, 1985). Therefore, exploration of the pathway between housing and stress should include, not only the characteristics and satisfaction within the dwelling or house, but also that of its immediate surroundings. "In that residence is not necessarily confined to a particular housing unit, but refers as well to 'place,' the term invites us to examine the situation of housing within its surroundings...residence encompasses locational attributes of the housing and physical and social attributes of its surroundings" (Hartig & Lawrence 2003, p. 458). Housing factors that shape health and capture a wider range of housing experience that may be influential upon health may include qualities of neighborhoods, which contribute to the sense of residential security and stability (Dunn 2000). Thus we need a broader conception of residence in exploring its potential associations with health (Hartig, Johansson and Kylin, 2003).

Based on the prior research, this paper explores the pathways between housing stress and a) a broader definition of residential satisfaction which includes, i) satisfaction within the dwelling (crowding), ii) satisfaction with the dwelling and immediate surroundings (a multi-component construct of housing satisfaction), and iii) satisfaction with the neighborhood; b) overall individual level of stress; and c) the relative importance of the immediacy of the contextual residential environment. Our study explores the effect of the satisfaction with the residential environment on general levels of stress. Specifically, the effect of the residential environment at three levels of immediacy: personal (crowding), home, and the neighborhood. We utilized survey data from previous studies of two small communities in Nebraska (Potter, Cantarero, Yan, Larrick & Ramirez, 1996; Potter, Cantarero, Yan, Larrick, Ramirez & Keele, 2001) in which data on the level of satisfaction and stress on a variety of quality of life components was gathered. We hypothesized that there would be a significant effect exerted by the residential environment on stress, and that it would be progressively stronger based on the immediacy of environment: crowding perception would exert the strongest effect at the personal, followed by the home, and then the neighborhood.

3. Methodology

3.1. Process

Data gathering consisted of two phases. The major thrust of phase one consisted of gathering information from focus groups. Because the two communities were recipients of large (im)migration in the past 15 years, separate focus groups were carried out with both long-time residents (living in town 15+ years) and recent arrivals (living in town 5 or less years). The sessions were structured around key quality of life domains gleaned from the literature: housing, neighborhood, services, community changes, improvements, stressors, and other related quality of life issues. The residents' responses were coded, categorized, analyzed and based on the results a survey instrument was developed. In phase two, the survey was administered to both long-term (more than 15 years) and newly-arrived residents (less than 5 years). The survey was developed in English and Spanish, pre-tested, and revised to insure a shared meaning of language.

3.2. Sample

U. S. Census block level data was used to establish two distinct sets of sampling blocks. The first group was based on the census blocks identified as having 5 or more racial/ethnic minority residents, to

insure an adequate sample of immigrants. The second group consisted of the remaining census blocks. A Simple Random Sample (SRS) of blocks from each group was generated for surveying. This design was applied to obtain a representative sample of both long-term and short-term residents. Both native speakers and bi-lingual (Spanish speakers) interviewers went door-to-door of the randomly selected blocks to seek survey participation by an eligible household member; households were approached until 5 eligible participants had completed the survey. Eligible members were defined as individuals living in the community for either five years or less, or fifteen years or more and meeting a minimum age criteria of 19 years of age. The sample included a total of 85 males (47.8%) and 95 females (52.2%). Slightly over fifty percent (n=91) of the total sample had lived in the community for 5 years or less. The mean age of the participants was 44.2 years. Thirty-one percent was foreign born. Nearly 30% had some college education and the modal income was \$22,000-29,999. The respondents were very cooperative with the survey team so the response rate was 96%.

3.3. *Instrument*

Respondents answered an approximately 100 item questionnaire. The survey for each community was slightly different, but only those questions common to both surveys were utilized in this analysis. The questions about housing covered issues regarding current residency, residential satisfaction, privacy, housing concerns, changes in the community, priorities, and contributors to the current housing condition. Neighborhood and city level topic headings included physical issues, service issues, social and cultural issues, economic issues, stress related concerns, social support, and health related issues. Respondents were asked to reply based upon a 1 to 5 Likert scale where 1 represented completely dissatisfied/strongly disagree and 5 represented completely satisfied/strongly agree. General demographic information was recorded as well as sentiments about what residents like and what they would like to change in their community.

3.4. *Analytical Procedure*

Based on our hypothesis of a progressively stronger effect of the immediacy of residential factors on housing struggle, we started by determining the variables to be used as independent variables (IVs) in a regression model. Overcrowding was measured using three separate variables: Number of persons/bedrooms, satisfaction with size of the residence, and satisfaction with level of privacy from others in the house. Number of persons/bedroom and number of persons/rooms are both used as crowding measures in the literature (Schluter, Carter & Kokaua, 2007; Baker, Zhang, Howden, Blakely, Saville & Crane, 2006; Gray, 2001). We did not aggregate the three variables into an index because we wanted to indentify the effect of each individual crowding measure. A Housing Index was created by averaging (mean) the variables measuring satisfaction with characteristics of the residence -- i.e., fire safety, crime safety, outdoor area, off street parking, rent/mortgage payment, overall physical condition, privacy from neighbors, and that it provides a healthy environment (Chronback's alpha = .757). A Neighborhood Index was created by averaging (mean) variables related to satisfaction with characteristics of the neighborhood -- i.e., quality of: housing, maintenance of the housing, overall visual attractiveness, adequacy of public services, garbage collection, street maintenance, traffic, parking of cars, and the overall air quality (Chronback's alpha = .763).

Correlation analysis between our environmental variables (crowding variables, housing index, and neighborhood index) and overall level of stress proved statistically insignificant. However, an alternative form of stress, the struggle for a better house proved to significantly correlate to both overall level of stress and our environmental variables, suggesting a possible indirect relationship between our

environmental variables and overall level of stress, via an intervening or mediator variable (Baron & Kenny, 1986): the struggle for a better house (see Table 1). This also suggested utilizing the struggle for a better house as the dependent variable for our regression model.

Table 1: Zero Order Correlation Matrix

Variables	1	2	3	4	5	6	7
1 Overall stress	1	.302**	.027	-.043	.053	-.140	-.055
2 Housing struggle		1	.543**	-.352**	-.269**	-.472**	-.155*
3 Persons/bedroom			1	-.389**	-.223**	-.431**	.030
4 Size of residence				1	.339**	.605**	.311**
5 Privacy					1	.463**	.244**
6 Housing index						1	.432**
7 Neighborhood Index							1

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

From the literature review we identified potential confounder variables that we would need to control for: income, age, gender, and if the resident was foreign born (31.3% of the sample population). As Diez Roux (2001) note, it is important to separate the contextual variables from these possible confounding compositional characteristics of the population. A model of our final correlation analysis is presented in Figure 1.

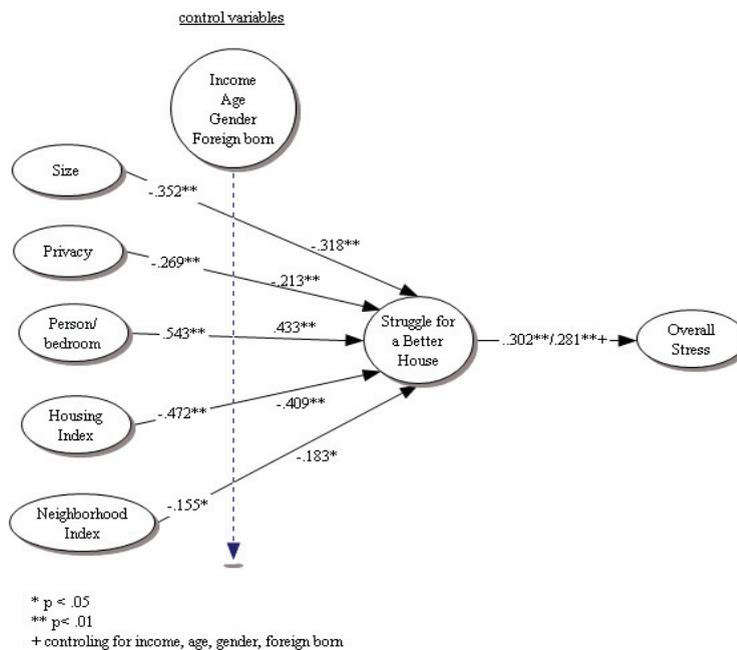


Fig. 1. Correlation Analysis

Based on the results of our correlation model, a hierarchical regression model was developed to explore the overall and relative effect of perceptions of the physical environment at three levels of immediacy -- personal, the home, and the neighborhood -- on stress from the struggle for a better house. Components of all three levels of the environment were expected to contribute indirectly to overall levels of stress via housing stress (one of the multiple contributors to overall levels of stress). as illustrated in

Figure 2. Although a number of other factors may also contribute to overall levels of stress -- e.g., the job, discrimination, health, lack of services lack of transportation -- these are not explored at this time. We screened our variables for assumptions of linearity and normality. Some of the independent variables exhibited some degree of skewness, and were normalized: income (log), persons-per-bedroom (log), satisfaction with the size of residence (reflective inverse), and privacy in the home (reflective inverse), housing index (reflective log), and the struggle for a better house (log). Transformation techniques were based on the severity and direction (positive or negative) of the skew. A regression utilizing the original data did not show any significant difference in the results of normalized data regression.

The three environmental factors considered in the regression model are overcrowding, residential characteristics, and neighborhood characteristics. The regression model also controls for potential confounders that may mediate or moderate the effect of our environment variables on housing stress - i.e., age, income, gender, and because of the large number of (im)migrants, being foreign born. The literature suggests that different cultures may have different perceptions of what is overcrowding (Evans, Lepore & Allen, 2000; Booth & Cowell, 1976), and our population contains a large number of members from different cultural backgrounds. The hierarchical regression method was utilized, in which the control variables were introduced first (to neutralize their effect), followed by our source of effect variables in order of level of immediacy -- personal (p/b, size, and privacy), followed by our housing index variable, and last our neighborhood index variable -- in order to help determine their separate and additive contribution effect on housing struggle.

4. Results and Discussions

The results of our hierarchical regression models are presented in Table 2.

Table 2. Hierarchical Regression Models for Housing Struggle.

Models	1			2			3			4		
	β	<i>p</i>	ΔR^2									
Independent Variable (Constant)		.0001			.0001			.043			.077	
Household income (log)	-.040	.603		-.063	.375		-.029	.671		-.033	.635	
Age	-.389	.0001*		-.120	.189		-.080	.368		-.078	.379	
Gender (male=1)	-.059	.434		-.069	.318		-.057	.395		-.061	.366	
Foreign born (yes=1)	.086	.258	.167*	.079	.253		.072	.282		.079	.247	
Persons/bedroom (log)				.329	.0001*		.310	.001*		.320	.001*	
Size of residence (inverse)				-.159	.040*		-.018	.836		-.015	.863	
Privacy (inverse)				-.170	.028*	.155*	-.082	.298		-.079	.318	
Housing index (log)							.309	.001*	.049*	.290	.004*	
Neighborhood index										-.042	.598	.001
Total R²=			.167			.322			.371			.373
F =	7.441	.0001*		9.841	.0001*		10.639	.0001*		9.440	.0001*	

Dependent variable: house struggle (log); * Statistically significant.

The initial step in the regression, model 1, includes only the control variables in order to eliminate their effect from our subsequent steps. It can be seen that the control variables contribute 16.7% of the variance in housing stress, and that age is the only statistically significant variable. Model 2 introduces the crowding variables, which contribute an additional and separate 15.5% to the variance of housing stress, and shows all three of the crowding variables as statistically significant. In model 3, size and privacy drop out from statistical significance, and are replaced by the housing index (which suggests that our subjective crowding measures are components of housing satisfaction), and contributes a smaller 4.9% of the variance of housing struggle. Finally, model 4, (shown in Figure 2) indicates a non-significant effect on the part of the neighborhood index; the two significant variables to effect the struggle for a better house are the objective measure of crowding -- persons-per-bedroom ($\beta = .320$) -- and satisfaction with the characteristics of the residence -- the housing index. The aggregate explanatory power of the independent variables of the model accounted for 37.4% of the variance in the struggle for a better house, a large effect according to Cohen (1988).

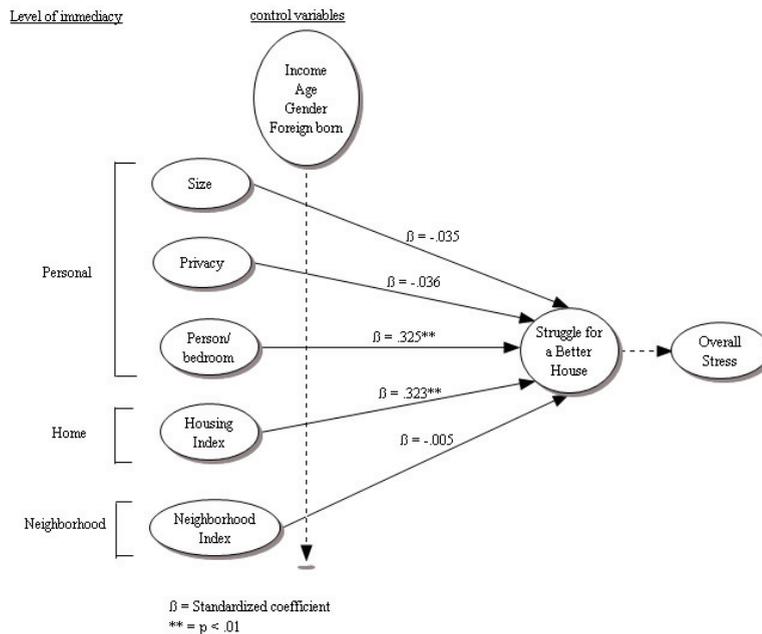


Fig. 2. Final Regression Model (4)

Our hypothesis was that the residential environment would exert a significant effect on stress, and that it would be progressively stronger based on the immediacy of environment: crowding perception would exert the strongest effect at the personal, followed by the home, and then the neighborhood. Although a direct relationship between the residential environment and the overall level of stress was not found, we did find an indirect connection via stress from the struggle for a better house. This suggests that although individually our residential factors did not affect overall stress, they might form part of a bundle of factors (some not examined in this paper) that form part of the concept, the struggle for a better house. The $R^2 = .373$ also suggests the existence of other contributing determinants to overall stress.

5. Conclusion

The strength of the effect of the residential environment does seem to be related to the immediacy of the environment. Thus, the additional explanatory power of the factors was strongest for the crowding variables, followed by the characteristics of the residence, and lastly by the neighborhood. Our results also point to the possibility that the immediate factors (variables) could be subsumed under a more general housing bundle/index. Some of these nuances of individual versus bundled variable effects could be better identified and determined with the application of a larger sample. The limited size of our sample (n=180) does pose severe limitation on identifying the statistical significance of our individual residential factors. Besides obtaining a larger sample, a potentially fruitful future research avenue is to incorporate in to our model, some other potentially relevant factors/variables that influence housing stress as well as overall stress. In conclusion, we believe the results support the hypothesis of a relationship between the environment in which we reside and stress in our communities, and that the immediacy of the environment exerts the strongest effect.

Acknowledgement

We would like to acknowledge the generous financial support of the Clarke Fund, University of Nebraska Foundation.

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