

Experiential Crowding and Mental Health: A Critical Review

Hotwani Geetu P and Tripathi S.K

Abstract: In recent years, research carried out in the field of environmental psychology and crowding was focused on outside density and crowded situations and its impact upon behavior in general. Furthermore, few studies have concluded on the detrimental impact of outside density and crowding on mental health problems. In the present review an attempt has been made to analyze the methodological considerations involved in crowding studies. In earlier studies, perceived crowding and experience of crowding have been considered to see its effects on human behavior. Crowding and mental health have shown detrimental effects which need to be investigated further.

Article History: Received: 07th March 2019, Revised: 14th April 2019, Accepted: 20th June 2019, Published: 30th June 2019.

INTRODUCTION

An attempt has been made to study the effects of experiential crowding on the mental health of children, their levels of anxiety and stress across age and gender. Prolonged high indoor population density often impairs mental and physical health, task performance, child development, and social interaction, Evans & Saegert (2000). High outdoor density, as in large cities, certainly can provide an enjoyable variety of social and cultural experiences. In general, high density tends to magnify pre-existing social conditions, Freedman (1975). Poor quality housing affects the socio-emotional health of children and adults (Evans, Wells, Chan & Saltzman (2000); Gifford & Lacombe (2006). The physical features of schools and other learning settings as a whole affect student and teacher outcomes. For example, many learning experiences are affected by school size, Barker & Gump (1964). High density may affect learning, Weinstein (1979). Space in classrooms affects student and teacher feelings. Most students and teachers prefer lower-density classrooms, because lower densities usually feel less crowded. Providing satisfying physical arrangements within schools is best accomplished by furnishing a variety of layouts. Softer, more home-like classrooms appear to improve student learning, Wollin & Montagne (1981), but will not become common until the attitudes of authorities, teachers, and students change. In terms of social behaviour, increased social density leads to increased aggression and withdrawal when other resources, architectural features, and teaching style do not counteract it (Weinstein 1979).

Crowding and Stress

Evans, Maxwell and Hart (1999) suggested that parents in more crowded homes were both less responsive and conversed with their children in less complex ways. The consequences of chronic exposure to high density for children has generally been documented as negative and includes increased aggression and hostility, poor academic performance, poor family social interaction,

and social withdrawal, Evans, Saegert & Harris (2001). Stokols, Ohlig, Resnick (1978) indicated that perceived residential crowding was strongly associated with increased sensitivity to crowding in a classroom situation. Jacinto and Mendieta (2002) suggested that exposure to multiple environmental stressors had a negative effect on people's lives. In laboratory settings, brief exposure to high spatial density is associated with mild stress in adults, primarily discomfort and a sense of being crowded (Sundstrom, 1978). Spatial density, or spatial constraint, can also result in attention overload in adults (Saegert, 1978). Factors such as environmental quality and interactions between children and other people in their environment affect a child's development, Bronfenbrenner (1979); Bronfenbrenner and Morris (1998). Children from more crowded homes have greater behavioral problems in the classroom (Evans, Lepore, Shejwal, & Palsane (1998); Saegert (1982), and there is greater conflict among parents and children in more crowded homes (Booth & Edwards, 1976; Evans et al., 1998; Saegert, 1982). Parents in more crowded homes are also more critical and less responsive to their children, Bradley & Caldwell (1984); Evans, Maxwell, & Hart (1999); Wachs (1989). One explanation for why crowding may be harmful to people is because of the loss of control over social interactions that frequently accompanies high-density living, Altman (1975); Baron & Rodin (1978); Schmidt & Keating (1979). Rodin (1976) reasoned that frequent, uncontrollable social interactions that occur under crowded living conditions might lead to a loss of self-efficacy in children and be manifested by elevated susceptibility to learned helplessness. Baum and colleagues, in an extensive program of research on crowding in college dormitories, demonstrated that residents of more crowded dorms felt less control over social interaction and exhibited more helpless behaviours in a group interaction game than their less-crowded counterparts (Baum, Gatchel, Aiello, & Thompson, 1981; Baum & Valins, 1977; 1979). High-density laboratory conditions also produce post crowding after effects among adults on unsolvable puzzles (Evans,

1979; Nicosia, Hyman, Karlin, Epstein, & Aiello, 1979; Sherrod, 1974) that are indicative of motivational deficits related to helplessness (Cohen, 1980; Glass & Singer, 1972). Using a similar paradigm, Fleming, Baum, and Weiss (1987) showed parallel data in a field study of neighbourhood crowding. Szpak, Loetscher, Churches, Thomas, Spence and Nicholls (2015) found that people who had signs of social discomfort showed mixed results. Lepore, Evans (1991) found that over time social relationships became increasingly strained in crowded households, people became less willing to discuss their problems with one another and levels of perceived social support among housemates diminished. Chronic exposure to uncontrollable ambient stressors, such as crowding and noise, seemed to increase susceptibility to helplessness, perhaps by decreasing expectancies for control. High density housing also seemed to be associated with increased helplessness in college students (Baum and Paulus, 1987).

Crowding and its effects on gender

Regoeczi (2008) found gender effects in response to crowding, results showed that men and women had reacted differently when they were exposed to crowding. Women showed symptoms of depression while coping and men showed withdrawal or aggressive tendencies. Ruback and Pandey (1991, 1996) found gender differences when there was exposure to crowding, results showed that women reacted more negatively to long term crowding. The number of children in the home had a negative impact on crowding. Kearney (2006) found that men responded to crowding with withdrawal and aggression, women responded with depression. Walden, Nelson, Smith (1981) found that men and women had different responses to crowding and they reacted in different ways to a crowded situation. Miller and Nardini (1977) found individual differences in response to crowding and certain personality variables were related to an individual's perception of crowding. Bonnes, Bonaiuto, Ercolani (1991) pointed out to the central importance of the environmental experience of the place in accounting for environmental perceptions. Fuller, Edwards, Vorakitphokatorn and Sermsri, (1993) found that objective and subjective household crowding were detrimental to various aspects of marital and family relations. Males reported a greater desire for privacy than females regardless of culture. Crowding was significantly influenced by perceived privacy regulation (Kaya and Weber, 2003).

The negative effects of environmental stressors could be reduced when individuals had high personal control. When individuals were crowded, an essential feature of the experience was that they lost much of their ability to control what happened to them. Schmidt (1983) distinguished three forms of personal control: cognitive, behavioral, and decisional. Under high-density conditions, the stress of crowding may be reduced if one

could attain one or more of the three forms of personal control. Baron, Mandel, Adams and Griffen (1976) evaluated the impact of tripling of male dormitory rooms normally used for double occupancies. The results showed that residents experienced greater feelings of crowding when they perceived less control over the room. Spencer and Banerji (1985) found that women performed activities in which there was more interaction and sharing of ideas. When the room was perceived as larger and the feeling of privacy in a room increased, the satisfaction with a dormitory room also increased (Kaya and Erkip, 2001).

Adegoke (2014) found significant negative effects on the physical and psychological health of the respondents, significant influence of gender and age on the perception of crowding. Mercer and Benjamin (1980) also examined the spatial behavior of university undergraduates in double occupancy residence rooms and compared the spatial behavior of male and female residents. Aiello et al. (1981) found more crowding effects in triple occupancy rooms where dual relationships developed and isolates felt negative and vulnerable. Spencer and Banerji (1985); Altman (1975); Baum and Paulus (1987) also indicated that the key psychological variables in shared accommodation and high-density situations were personal space, privacy and territoriality. Altman (1975) suggested that people may seek to interact with others maintaining some distance and control of the situation. They may want their own space for themselves when they would like to avoid situations. Taylor and Fergusson (1980) found that students sought solitude as another strategy for achieving privacy. There was a greater tendency for students to avoid their roommates (Baum and Valins 1977).

Freedman, Levy, Buchanan and Price (1972) studied the impact of crowding on interpersonal relations. It was found that male subjects responded unfavourably to increasing density while female response was favourable. Ruback and Riad (1994) found that women received more social support under high density conditions whereas men received more social support under low density conditions. In college dormitories, the consequence over time was shown to be that the residents appeared to give up efforts at trying to cope or to regulate interactions, Baum and Valins (1977). Baum and Paulus (1987) hypothesized that the types of strategies employed depended on the extent to which individuals have choices above exposure to alternatives. When a high degree of choice about exposure to crowded situation existed, avoidance would be the most likely strategy. On the other hand, when exposure to crowding was inevitable, there could be an attempt to change, control, or adjust to the situation. Amole (2005) indicated that respondents experienced crowding stress. One of the most used strategies found in this study was studying away from the bedroom. The results showed that the

bedroom was perceived as spatially and socially dense and that both the avoidance or withdrawal and control or territorial types of strategies were used to similar degrees. Household density affected both psychological well-being and academic performance. School density affected girls more than boys (Maxwell, 2003).

Stokols, Ohlig and Resnick (1978) found that residential crowding was related to medical problems, health issues and academic problems. People who had perceived more social support appeared to be resistant to the effects of stressors in the environment than those with lower levels of perceived social support, Lepore, Evans and Schneider (1992). Some studies showed that children may reduce interaction when they were exposed to a crowded environment. Loo and Smetana's (1978) study on ten year old boys indicated that crowding had an effect on variables related to active play, avoidance, discomfort and dislike in a group. The links between density and withdrawal occurred among 10 to 12 year-olds who lived at home (Evans, Lepore, Shejwal and Palsane 1991).

Crowding, its effects on behaviour

Goux and Maurin (2004) found that children in large families perform much less well than children in small families, but their estimates suggest that this was mostly due to the fact that they may be exposed to more crowding at home. Maxwell (1996) indicated that crowding in day care centres was associated with attention deficits. Tayeg (2015) found that the problems in overcrowded classrooms included noise making, lack of individual attention to the students and inadequate arrangements in the classroom which affected interaction in class. Epri (2016) found that students faced difficulties in learning in a crowded environment, teachers work increased and they were unable to support the students, which increased absenteeism and stress. Aiello, Nicosia, Thompson (1979) showed that male but not female skin conductance levels were higher under crowded conditions, and the longer the exposure, the greater the elevation. Evans et al. (1998) found that boys and girls who lived in more crowded homes had different responses to crowding. Evans and Saegert (2000) found that both male and female children in higher density apartments had elevated blood sugar and blood pressure levels, especially when there was greater family turmoil in the household. It was found that urban inner city children were more exposed to crowding, boys were more affected. Children were less likely to persist in working on challenging puzzles (Gray, 2001).

Baum and Koman (1976) found that people living in high social density environments were more likely to become socially withdrawn, while people responded to spatial density by showing aggressive behaviour. The effect of crowding on the amount of trauma one sustained was seen as a function of the incidence of aggression. Ginsburg, Pollman, Wauson,

Hope (1977) found that children engaged in more frequent episodes of aggression in a small playground. Short term manipulations had varied numbers of persons and room size and measured perceptions of crowding, physiological arousal, task performance, aggression or competition, and interpersonal relations, Freedman (1975), Mackintosh and Saegert (1975). Some studies had shown that density could be related to aggression and discomfort, Saegert (1975), while others suggested that density intensified the dominant feature of the situation, whether positive or negative, Freedman (1975). Parents living in congested homes felt harassed by their children and were relieved when the children were outside the dwelling, showed less support for their children, and punished their offspring more frequently (Gove and Hughes, 1983).

Zeedyk-Ryan and Smith (1983) found that crowded students were significantly more hostile than uncrowded students. Hostility and anxiety were both significantly affected by time. Matthews, Paulus, Baron (1979) found that subjects may use social withdrawal than aggression as a response to high density conditions. Regoez (2002) suggested that individuals may exhibit aggression and/or withdrawal as a response to high-density conditions but individuals with tendencies toward aggressive and/or withdrawn behavior also selected themselves into lower-density housing environments. He also indicated that such relationships were non-linear in nature bringing in a different area of study for future research. Makinde, Bjorkqvist and Osterman (2016) indicated that overcrowding had a huge influence on the lives of adolescents in the form of aggression from siblings as well as adults. Parental negativity and disturbed family relations were present with a higher level of anti-social problems. Evans, Saegert and Harris (2001) suggested that third-through fifth-grade children residing in poorer quality housing had more psychological symptoms and less task persistence than their counterparts who lived in better quality housing. Loo and Smetana (1978) found that boys responded more aggressively to a high density situation. Elevated levels of aggression and conflict as well as diminished levels of cooperation occurred among more crowded preschoolers (Bates 1970, Rohe and Patterson 1974, Aiello, Nicosia, Thompson 1979).

Crowding and Depression

Lepore (1991) noted that people who were exposed to long term crowding could become psychologically demoralized, depressed and anxious. Prerost (2010) indicated the possible inhibiting effects of crowding on the development of positive mood states. Males and females representing early, middle, and late adolescence were examined under conditions of high and low spatial density. Subjects were provided with positive mood-inducing stimuli or neutral stimuli when they experienced high density conditions. Crowding did not

produce any negative effects in groups beyond young adolescence. The mood was a little low for adolescent boys and girls. Weich, Blanchard, Prince, Burton, Erens and Sproston (2002) suggested that the prevalence of depression was associated with independently rated features of the built environment, independent of individuals' socio-economic status and internal characteristics of dwellings. Living in neighborhoods characterized by a poor quality built environment was associated with a greater likelihood of depression (Galea, Ahern, Rudenstine, Wallace and Vlahov, 2005).

Perceived crowding was hypothesized to relate positively to felt demands and stress. The higher the level of perceived crowding, the higher the level of stress experienced, and it was felt that household members made excessive demands. Virtually every model of crowding effects, as well as numerous empirical studies, suggested that felt demands, stress, or some closely related phenomenon was a crucial linkage in explaining pathological behaviours (Altman 1975; Desor 1972; Gove, Hughes, and Galle 1979; Stokols 1972). Aiello et al. (1975) found physiological evidence of stress reactions among crowded subjects. Males and females in small rooms had higher skin conductance levels than they did in a room characterized as non-crowded. Evans (1975) found that crowding acted as a stressor mediated by high arousal with decrements in task performance. Lepore and Evans (1996) suggested that when a person was already coping with a few stressors, he may not be able to cope with additional or more stress causing factors. These authors also made a distinction between the additive effects of multiple stressors and multiplying effects. Chronic exposure to crowded settings at home and in child-care centres had negative consequences on four-and-a-half-year-old children. The combination of these two crowded settings increased behavioural disturbance more than being exposed to a single crowded setting Maxwell (1996). Maxwell (1996) indicated that such results were consistent with Cohen, Evans, Stokols, Krantz (1986) contextual perspective on stress which suggested that behavioural response to a stressor in one setting could be moderated by stressful conditions in another setting. Similarly, Evans, Lepore, Schroeder (1996) found higher negative effects and after effects when both stressors were concurrent. Coping with the continual demands of multiple environmental stressors caused fatigue and the wearing down of the individual's personal and social resources (Cohen et al. 1986). Krieger and Higgins (2002) have found that crowding maybe related to the physical and psychological health of people. Children who lived in crowded homes may have had poorer cognitive and psychomotor development or were under more stressed conditions, Evans (2006). Bradley and Caldwell (1984) noted that infections and stress maybe related to crowding. Individuals may withdraw from social interaction as a method of coping

with fatigue or residual arousal accompanying stressful encounters. Withdrawal may assist people to recover from short-term stressors by allowing down time to replenish energy reserves, Repetti (1992). Visual exposure and larger group size caused stress from the feelings of closeness and distraction and the appearance of coping behaviour (Kutner, 1973).

High density in the home also could interfere with goal attainment (Stokols 1972, 1976) as well as cause physical interference, such as restricting movement or escape from certain sources of stress (e.g. roommates), Saegert (1973), McCarthy and Saegert (1978). There was considerable evidence that low levels of control over the physical environment contributed to psychological distress, Cohen et al. (1986). It was assumed that even if coping behaviours alleviated stress in the short term, continued crowding ultimately resulted in some form of pathological reactions, Sherrod and Cohen (1979). Conflict would be manifested between husband and wife, between parents and children, and, perhaps to a lesser extent, between the primary family and other members of the household (an older generation, other relatives, or unrelated occupants). Altman (1975) found that if a person did not get his own space, it may lead to stress and may affect his ability to cope with further stress. High density environments may not be stressful for some people but uncontrollable crowded environments which may stop or hinder goal attainment may cause stress to individuals (Sherrod and Cohen 1979). Prolonged high indoor population density often impairs mental and physical health, task performance, child development, and social interaction (Evans and Saegert, 2000).

Conclusions

- The exposure to crowding has shown detrimental effects on child development and behaviour.
- Studies have shown that these effects can affect coping in the long run and could become chronic in nature.
- Crowding was found to affect the physical and mental health of individuals.
- Crowding affected family life and impacted parent and child relationships.
- Crowding worsened aggression and discipline issues.
- The impact of crowding was seen in residential and hostel accommodation and it created more conflict issues.
- People needed more space when they were exposed to crowding and coped by using strategies like withdrawal, coalition groups and territoriality.
- The experience of crowding was worse when goal attainment was blocked and there was limited choice available in the environment.

References

- Adegoke, A., A. (2014). *Perceived effects of overcrowding on the physical and psychological health of hostel occupants in Nigeria*, IOSR Journal of Humanities and Social Science, 19, pp 01-09.
- Aiello, J.R., Baum, A, Gormley, F, P. (1981). *Social determinants of residential crowding stress*. Personality and Social Psychology Bulletin, 7, 643-649.
- Aiello, J., R , DeRisi, D,T, Epstein, Y, M and Karlin,R,A. (1975). *Crowding and the Role of Interpersonal Distance Preference*, Sociometry, Vol. 40, No.3, pp. 271-282. Published by: American Sociological Association DOI: 10.2307/3033534.
- Aiello, J.R., Nicosia, G, Thompson, D.E. (1979). *Physiological, social and behavioural consequences of crowding on children and adolescents*. Child Development, Vol. 50, No.1, pp. 195-202.
- Altman, I. (1975). *The environment and social behavior*. Monterey, CA: Brooks/Cole.
- Amole, D. (2005). *Coping strategies for living in student residential facilities in Nigeria*, Environment and Behaviour, Vol. 37, No. 2, 201-219.
- Barker, R. G., & Gump , P. V. (Eds.). *Big school, small school: High school size and student behavior*. Stanford, CA: Stanford University Press.
- Baron, R. M., & Rodin, J. (1978). *Personal control as a mediator of crowding*. In A. Baum,
- J. E. Singer & S. Valins (Eds.), *Advances in environment psychology* (Vol. 1, pp. 145-181). Hillsdale, NJ: Lawrence Erlbaum.
- Baron, R. M., Mandel, D, Adams, C and Griffen. L. (1976). *Effects of social density in university residential environments*. Journal of Personality and Social Psychology, 34, 434-446.
- Bates B. 1970. *Effects of social density on the behavior of nursery school children*. Annu. Rev. Psychol. 2006.57:423-451. Unpublished doctoral dissertation University of Oregon, Eugene.
- Baum, A., Gatchel, R., Aiello, J. R., & Thompson, D. (1981). *Cognitive mediation of environmental stress*. In J. H. Harvey (Ed.), *Cognition, social behavior, and the environment* (pp. 513-533). Hillsdale, NJ: Lawrence Erlbaum.
- Baum, A., & Koman, S. (1976). *Differential response to anticipated crowding: Psychological effects of social and spatial density*. Journal of Personality and Social Psychology, 34, 526-536.
- Baum, A.,&Valins, S. (1977). *Architecture and social behavior: Psychological studies of social density*. Hillsdale, NJ: Lawrence Erlbaum.
- Baum, A., & Valins, S. (1979). *Crowding and the regulation of social contact*. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 12, pp. 131-175). New York: Academic Press.
- Baum, A., & Paulus, P. (1987). *Crowding*. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vols. 1 & 2, pp. 533-570). New York: John Wiley.
- Bonnes, M, Bonaiuto, M, Ercolani, A. (1991). *Crowding and residential satisfaction in the urban environment*, Environment and Behaviour, Vol 23, No.5, 531-552.
- Bradley, R. H., & Caldwell, M. (1984). *The HOME inventory and family demographics*. Developmental Psychology, 20, 315-320.
- Bronfenbrenner, Urie, "Contexts of Child Rearing: Problems and Prospects." American Psychologist, 34, (no. 10) (1979): 844-50.
- Bronfenbrenner, Urie, and Pamela A. Morris, "The Ecology of Developmental Processes." In William Damon and Richard M. Lerner, eds., *Handbook of Child Psychology: Volume 1: Theoretical Models of Human Development*, 993-1028. (Hoboken, NJ: John Wiley & Sons, Inc, 1998.
- Cohen, S. (1980). *After effects of stress on human performance and social behavior: A review of research and theory*. Psychological Bulletin, 88, 82-108.
- Cohen, S., Evans, G, W., Stokols, D., Krantz, D, S. (1986). *Behaviour, health, and environmental stress*. New York: Plenum.
- Desor, J. (1972). "Toward a psychological theory of crowding." Journal of Personality and Social Psychology 21: 79-83.
- Epri, M., L. (2016). *A case study on the impact of large classes on student learning*, Contemporary PNG Studies: DWU Research Journal Vol. 24.
- Evans, G., W. (1975). *Behavioral and physiological consequences of crowding in humans*. Doctoral Dissertations 1896-February 2014.1582.
- Evans, G.W. (1979). *Behavioral and physiological consequences of crowding in humans*. Journal of Applied Social Psychology, 9, 27-46.
- Evans, G., W. (2006). *Child development and the physical environment*, Annu. Rev. Psychol. 57:423–51.
- Evans, G., W, Lepore, S, J, Shejwal, B and Palsane, M, N. (1998). *Chronic residential crowding and children's well being: an ecological perspective*. Child Development, 69, 1514^1523.
- Evans, G., W, Lepore, S, J, Schroeder, A. (1996). *The Role of Interior Design Elements in Human Responses to Crowding*. Journal of Personality and Social Psychology, Vol. 70, No. 1, 41-46.
- Evans, G. W., & Saegert S. (2000). *Residential crowding in the context of inner city poverty*. In S. Wapner, J. Demick, C. T. Yamamoto, & H. Minami (Eds), *Theoretical perspectives in environment-behavior research: Underlying assumptions, research problems, and methodologies* (pp. 247 – 267). New York: Kluwer Academic/Plenum Publishers.
- Evans, G. W., Wells, N. M., Chan , H. Y. E. , & Saltzman , H. (2000). *Housing quality and mental health*. Journal of Consulting and Clinical Psychology, 68, 526 – 530.

- Evans, G., W, Maxwell, L, M and Hart, B. (1999). *Parental language and verbal responsiveness to children in crowded homes*. Crowding and Children's Mental Health. Developmental Psychology, 35, 1020-1023.
- Evans, G., W, Saegert, S and Harris, R. (2001). *Residential Density and psychological health among children in low income families*, Environment and Behaviour, Vol. 33, No 2, 165 – 180.
- Fleming, I., Baum, A., & Weiss, L. (1987). *Social density and perceived control as mediators of crowding stress in high-density residential neighborhoods*. Journal of Personality and Social Psychology, 52, 899-906.
- Freedman, J. L. (1975). *Crowding and behavior*. San Francisco: Freeman.
- Freedman, J. L., Levy, A. S, Buchanan, R. W, and Price. (1972). *Crowding and human aggressiveness*. Journal of Experimental Social Psychology, 8, 528-548.
- Fuller, T., D, Edwards, J, N, Vorakitphokatorn, S and Sermsri, S. (1993). *Household crowding and family relations in Bangkok*. Social problems, Vol. 40, No.3, August 1993.
- Galea, S, Ahern, J, Rudenstine, S, Wallace, Z and Vlahov, D. (2005). *Urban built environment and depression: a multilevel analysis*, J Epidemiol Community Health; 59:822-827. doi: 10.1136/jech.2005.033084.
- Gifford, R., & Lacombe, C. (2006). *Housing quality and children's socio-emotional health*. Journal of Housing and the Built Environment, 21, 177 – 189.
- Glass, D. C., & Singer, J. E. (1972). *Urban stress*. New York: Academic Press.
- Ginsburg, H., J, Pollman, V.A, Wauson, M, S, Hope, M, L. (1977). *Variation of aggressive interaction among male elementary school children as a function of changes in spatial density*. Environmental Psychology and Nonverbal Behavior, 2(02), 67-74.
- Goux, D & Maurin, E. (2004). *The effect of overcrowding housing on children's performance at school*, Journal of Public economics, 89, Pgs 797-819.
- Gove, W., R & Hughes, M. (1983). *Overcrowding in the household: An analysis of determinants and effects*. New York, NY: Academic Press.
- Gove, W.R., Hughes, M, Galle, O (1979). *Overcrowding in the home: An empirical investigation of its possible pathological consequences*. American Sociological Review, Vol. 44, No. 1, pp. 59-80.
- Gray, A. (2001) *Definitions of Crowding and the Effects of Crowding on Health: a Literature Review*. Published by the Ministry of Social policy, New Zealand.
- Jacinto, L., G and Mendieta, I., H. (2002). *Multiple effects of community and household crowding*, Journal of Environmental Psychology (2002) 22, 233-246.
- Kaya, N and Erkip, F. (2001). *Satisfaction in a dormitory building*, Environment and Behavior, Vol. 33 No. 1, 35-53.
- Kaya, N and Weber, M, J. (2003). *Cross-cultural differences in the perception of crowding and privacy regulation: American and Turkish students*, Journal of Environmental Psychology 23 (2003) 301-309.
- Kearney, A., R. (2006). *Residential development patterns and neighbourhood satisfaction*, Environment and Behavior, Vol. 38 No. 1, 112-139.
- Kutner, David H, Jr. (1973). *Overcrowding: Human responses to Density and visual exposure* 1973. Human Relations Vol. 26, 1, 31-50.
- Krieger, James & L Higgins, Donna. (2002). *Housing and Health: Time Again for Public Health Action*. American journal of public health. 92. 758-68. 10.2105/AJPH.92.5.758.
- Lepore, S., J, Evans, G, W. (1991). *Household crowding and mental health: The importance of exposure duration* 1991, EDRA 22/1991. Thematic Session: Psychological and Design Issues in Housing.
- Lepore, S. J., and Evans, G, W. (1996). *Coping with multiple stressors in the environment*. In M. Zeidner & N. S. Endler (Eds.), Handbook of coping: Theory, research, applications (pp. 350-377). Oxford, England: John Wiley & Sons.
- Lepore, S. J., Evans, G.W., & Palsane, M. N. (1991). *Social hassles and psychological health in the context of crowding*. Journal of Health and Social Behavior, 32, 357-367.
- Lepore, S., J, Evans, G, W and Schneider, M, L. (1992). *Role of Control and Social Support in explaining the Stress of Hassles and Crowding*. Environment and Behaviour, 24(6), 795-811.
- Loo, C., Smetana, J. (1978). *The effects of crowding on the behaviour and perception of 10 year old boys*. Environmental Psychology and Nonverbal Behaviour 2(4).
- Kearney, A., R. (2006). *Residential development patterns and neighbourhood satisfaction*, ENVIRONMENT AND BEHAVIOR, Vol. 38 No. 1, 112-139.
- Mackintosh, E., W, Saegert, S. (1975). *Two studies of crowding in urban public places*, Environment and Behavior, Vol. 7 No. 2, June 1975.
- Makinde, O, Bjorkqvist, K and Osterman, K. (2016). *Overcrowding as a risk factor for domestic violence and antisocial behaviour among adolescents in Ejigbo, Lagos, Nigeria*. Glob Ment Health (Camb); 3: e16. doi: [10.1017/gmh.2016.10].
- Matthews, R., W, Paulus, P, B, Baron, R, A. (1979). *Physical aggression after being crowded*. Journal of Nonverbal Behaviour, 4(1), Fall 1979.
- Maxwell, L., E. (1996). *Multiple effects of Home and Day care Crowding*. Environment and Behaviour, Vol. 28, No. 4, Pp. 494-511.
- Maxwell, L., E. (2003). *Home and school density effects on elementary school children*, Environment and Behaviour, Vol 35, No.4, July 2003, 566-578.

- Mc Carthy, D. and Saegert, S. (1978). *Residential density, social overload, and social withdrawal*. Human Ecology, Vol. 6, No. 3.
- Miller, S & Nardini, K. M. (1977). *Individual differences in the perception of crowding*, Environmental Psychology and Nonverbal Behavior, 2(1).
- Nicosia, G., Hyman, D., Karlin, R. A., Epstein, Y. M., & Aiello, J.R. (1979). *Effects of bodily contact on reactions to crowding*. Journal of Applied Social Psychology, 9, 508-523
- F.J. (1981). *The Development of the Mood-Inhibiting Effects of Crowding During Adolescence*, Pages 197-202.
- Rodin, J. (1976). *Density, perceived choice, and responses to controllable and uncontrollable outcomes*. Journal of Experimental Social Psychology, 12, 564-578.
- Regoeczi, W., C. (2002). *The Impact of Density: The Importance of Nonlinearity and Selection on Flight and Fight Responses*. Social Forces, 81(2), 505-530.
- Regoeczi, W., C. (2008). *Crowding in Context: An Examination of the Differential Responses of Men and Women to High-Density Living Environments*. Journal of Health and Social Behavior, Vol 49, 254-268.
- Ruback, R., B., and Pandey, J. (1991). *Crowding, perceived control, and relative power: An analysis of households in India*. Journal of Applied Social Psychology, 23115-3, 44.
- Ruback, R., B., and Pandey, J. (1996). *Gender differences in perceptions of household crowding: Stress, affiliation, and role obligations in rural India*. Journal of Applied Social Psychology, 24167-4. W.F.E. Preiser (ed.)
- Ruback, R., B., Riad, J, K. (1994). *The more (Men), the less merry: Social density, social burden and social support*, Sex roles, Vol 30, No. 11/12, 1994.
- Repetti, R. L. (1992). *Social withdrawal as a short-term coping response to daily stressors*. In H.Friedman (Ed.), *Hostility, coping, and health* (pp.151-165). Washington, DC: American Psychological Association.
- Saegert, S. (1973). *Crowding: Cognitive overload and behavioral constraint*. Environmental Design Research. 2.
- Saegert, S. (1975). *Two studies of crowding in urban public spaces*. ENVIRONMENT AND BEHAVIOR, Vol. 7 No. 2, June 1975 Sage Publications, Inc.
- Saegert, S. (1978). *High density environments: Their personal and social consequences*. In A. Baums & Y. M. Epstein (Eds.), *Human responses to crowding* (pp. 257-281). New York: John Wiley.
- Saegert, S. (1982). *Environment and children's mental health: Residential density and low income children*. In A. Baum & J. E. Singer (Eds.), *Handbook of psychology and health* (Vol. 2, pp. 247-271). Hillsdale, NJ: Lawrence Erlbaum.
- Schmidt, D., & Keating, J. P. (1979). *Human control and personal control: An integration of research*. Psychological Bulletin, 86, 680-700.
- Schmidt, D., E. (1983). *Personal control and crowding stress - A test of similarity in two cultures*, Journal of cross - cultural psychology, Vol 14, No.2, 221-239.
- Sherrod, D. (1974). *Crowding, perceived control, and behavioral aftereffects*. Journal of Applied Social Psychology, 4, 171-186.
- Sherrod, D, R., and Cohen, S (1979). *"Density, personal control, and design."* In Residential Crowding and Design, ed. John Aiello and Andrew Baum, 217-227. New York: Plenum.
- Spencer, C and Banerji, N. (1985). *Strategies for sharing student accommodation*. Architecture and Behavior, 2, 123-135.
- Stokols, D. (1972). *On the distinction between density and crowding: Some implications for future research*. Psychological Review. 79(3), 275-277.
- Stokols, D. (1976). *The experience of crowding in Primary and Secondary Environments*. Environment and Behavior, Vol. 8 No. 1, March 1976.
- Stokols, D, Ohlig, W, Resnick, S, M (1978). *Perception of residential crowding, classroom experiences, and student health*, Human Ecology, Vol. 6, No.3.
- Sundstrom, E. (1978). *Crowding as a sequential process: Review of research on the effects of population density on humans*. In A. Baums & Y. M. Epstein (Eds.), *Human responses to crowding* (pp. 31-116). New York: John Wiley.
- Szpak, A, Loetscher, T, Churches, O, Thomas, N, A, Spence, C, J and Nicholls, M, E, R. (2015). *Keeping your distance: Attentional withdrawal in individuals who show physiological signs of social discomfort*, Neuropsychologia- Vol 70, 2015. pgs 462-467.
- Tayeg, A. (2015). *Effects of Overcrowded Classrooms on Teacher-Student Interactions*, Case Study EFL Students at Biskra University.
- Taylor, R., B. and Fergusson, G. (1980). *Solitude and Intimacy: Linking Territoriality and Privacy Experiences*, J. of Nonverbal Behaviour, 4, 227-239.
- Wachs, T. D. (1989). *The nature of the physical microenvironment: An expanded classification system*. Merrill Palmer Quarterly, 35, 399-419.
- Walden, T., A, Nelson, P, A, Smith, D, E. (1981). *Crowding, Privacy and Coping*. Environment and behavior. 13(2): 205-224.
- Weich, S, Blanchard, M, Prince, M, Burton, E, Erens, B and Sproston, K. (2002). *Mental health and the built environment: cross-sectional survey of individual and contextual risk factors for depression*. Br J Psychiatry, 180:428-33.
- Weinstein, C. S. (1979). *The physical environment of the school: A review of the research*. Review of Educational Research, 49, 577 - 610.
- Wollin, D. D., & Montagne, M. (1981). *College classroom environment: Effects of sterility versus amiability on student and teacher performance*. Environment and Behavior, 13, 707 - 716.

Zeedyk-Ryan, J., and Smith, G. F. (1983). *The effects of crowding on hostility, anxiety, and desire for social interaction*. The Journal of Social Psychology 120,(2),245-252.
<http://dx.doi.org/10.1080/00224545.1983.9713218>