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ABSTRACT

The effects of spatial density on five styles of children's behavior (aggression, passivity, self-involved play, avoidance, and instability of activity) were studied. Subjects were 72 five-year-olds, half male, half female. Twelve groups of six children participated in 54-minute sessions of free play in an adult-free situation. A multivariate analysis of variance was performed on all five behavior style variables with five factors: density, personal space, sex, order, and group. A univariate analysis of variance for each behavior style was also performed. The multivariate analysis indicated significant effects for density, sex, order and group. The univariate analysis indicated that there are significant effects of density on children's behavior. Children demonstrate different behavior styles in coping with spatial conditions. Where space is limited, they become more aggressive and interact less positively; they become vigilant onlookers who stand, rather than run, walk or sit; they use various methods of escape and avoidance; and their social play or toy-play activities are more unstable. There appear to be significant sex differences in response to crowding in which boys tend to show greater effects than girls. (Author/MS)

# The Effects of Spatial Density on Behavior Styles of Children[1]

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The impact of the physical setting on children's behavior has been stressed by many persons. Interest in the effects of density on children's behavior has been generated by research in naturalistic settings and in laboratory "play-room" settings. Much of the research on the effects of density on children has focused on social behaviors such as aggression and social interaction. Specific dependent variables have been investigated but analyses of styles of behaving had not been explored. By "styles" of behaving I refer to clusters of variables which may combine social, asocial, antisocial behaviors; motoric positions; strategies of escaping from or coping with stress; characteristics of toy play; and stability of activity. Analyzing the effects of density on behavior styles can potentially provide a more comprehensive and sophisticated understanding of crowding effects than is provided by findings for separate dependent variables.

Five behavior styles, derived partly from a factor analysis of many dependent variables, were investigated. The first was aggression, which was scored as frequency of physical aggression + playful aggression -



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positive social overtures. The second behavior style was passivity or standing vigilance, scored as frequency of standing + onlooking behavior, a combination of a motoric mode and an asocial interaction variable. The third behavior style was self-involved play, scored as frequency of sitting + solitary play - non-toy play. Thus, a self-involved child was one who sat alone and engaged in solitary toy play. Unlike the passive or standing vigilant style where attention was directed towards others, the self-involved style was characterized as attention directed towards the self and his/her own activities. The fourth behavior style was avoidance, scored as frequency of escape attempts + facing out positions. Escape behavior included attempts to open the door, gazing out the window or into the one-way mirror. Avoidance behaviors were assumed to represent attempts to adjust or cope with a stressful crowded condition by maximizing interpersonal distance, eliminating external stimuli from view, and developing strategies to establish symbolic distance or to leave the situation. The fifth behavior style was instability of activity which was scored as the frequency of interruptions + toy changes.

## Method

A repeated measures design was used in which children served as their own controls by undergoing both density conditions. The order effects of administration of low and high density conditions were controlled by counterbalancing.

A multivariate analysis of variance was performed on all five behavior style variables with five factors: density (a repeated measure), personal space, sex, order, and group. In addition, a univariate analysis of variance for each behavior style was performed.

The setting for the low density condition was a room which measured 19'6" X 13'5" (a total area of 260.5 square feet). A portable wall erected along the width of the room constituted the high density condition which measured 9'9" X 13'5" (a total area of 130.8 square feet). The room was equipped with a one-way mirror and microphones which hung from the ceiling, permitting the children to be seen and heard in the adjoining room. Participants were 72 normal children five years of age; 36 were male and 36 were female. Each session lasted 54 minutes and consisted of free play in an adult-free situation. Twelve groups of six children each were tested; three girls and three boys constituted each group.

The children were told that they could play in the playroom for about an hour. In the adjoining room, research assistants rated the children's behavior.

## Results

The multivariate analysis of variance for all behavior styles combined indicated that there were significant effects for density ($p < .05$), sex ($p < .01$), order ($p < .05$) and group ($p < .001$). Additionally, there was a significant interaction effect for Sex X Density ($p < .01$).

The univariate analysis of variance on each behavior style revealed a significant effect for density on all behavior styles. There was more aggression in the high density condition than in the low density condition ($F = 66.43$, $p < .001$). Girls showed less reaction to density effects than did boys, who were more aggressive than girls and showed the greatest amount of aggression in the high density condition. The finding of sex differences is consistent with prior research demonstrating greater effects of density on boys than girls. However, this finding regarding direction of effects

is in opposition to the 1972 findings of Loo, suggesting that a curvilinear relationship between density and aggression may exist, since the high density condition in this study was larger than in the 1972 study. Thus, given highly crowded conditions, children may be "catatonically" immobile, whereas they would be aggressive when crowded but still able to attack and retreat.

There was significantly more passivity or vigilant onlooking in the high density condition ($\bar{X}$=31.92) than in the low density condition ($\bar{X}$=21.18, $F = 29.41$, $p < .001$). Children stood onlooking when they were crowded; they tended to not sit nor run nor socially interact. One might call this a vigilance stance in a condition of stress. Standing provides the maximal interpersonal distance from others and occupies the smallest amount of floor space compared to other body positions or movements. Onlooking, as opposed to interaction, reduces interpersonal stimulation; and onlooking, in contrast to solitary play, reduces the possibility of interruptions of one's activity by "intruding" others.

There was significantly more self-involved behavior in the low density condition than in the high density condition. Children sat alone, involved in their own toy activity when in spacious conditions. Thus, in a high density condition children tend to not get involved in social play or toy play; crowding prevents toy play while uncrowded conditions allow for prolonged toy activity. This effect was greater for boys than it was for girls.

There was significantly more avoidance in the high density condition ($\bar{X}$=18.60) than in the low density condition ($\bar{X}$=12.04, $F = 5.78$, $p < .05$) and the effects were greater for boys than they were for girls. In a crowded condition children use strategies to escape physically and/or psychologically from

the stressful situation.

There was significantly more unstable activity in the high density condition ($\bar{X}$=40.06) than in the low density condition ($\bar{X}$=35.10) at the .05 level of significance ($F = 5.34$). In a crowded condition children were more frequently interrupted and changed toys more frequently. It is quite possible that frequent toy changes reflect a) a behavioral consequence of frequent interruptions, b) inability to concentrate on any one activity for any prolonged length of time, or c) boredom or disinterest.

In summary, our research indicates that there are significant effects of density on children's behavior. Children demonstrate different behavior styles in coping with or adapting to spatial conditions. Where space is limited, they become more aggressive and interact less positively; they become vigilant onlookers who stand rather than run, walk, or sit; they use various methods of escape and avoidance; and their social play or toy play activities are more unstable and interrupted more frequently. Prolonged toy play, thought to be an important part of child development, is difficult to achieve in crowded conditions. Moreover, it appears that there are significant sex differences in response to crowding in which boys tend to show greater effects than girls.