ENVIRO NMENTAL QUALITY AND THE WELLBEING OF CHILDREN*

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ABSTRACT. There are many reasons for believing that the environment exerts an influence (directly or indirectly) on the wellbeing of children and families. However, while clear evidence is available that low socioeconomic status is associated with lower than average levels of wellbeing, especially among adults, the evidence linking the social and emotional adjustment of children with the quality of the environment is patchy and equivocal. In this paper we focus on three levels of the family environment: the street, the home and the neighborhood. Neighborhood quality was measured by the Vinson-Homel social problems index, street-type as residential or commercial/retail, and housing quality in terms of upkeep, floor occupied, availability of playspace and occupancy type. The research hypothesis was that after allowing for community selection processes children living in lower quality environments would be less satisfied with various areas of their lives, would experience more negative emotions, and would have more restricted and less positive friendship patterns. The sample comprised 321 families which included a 9—11 year old child, drawn from 18 neighborhoods of Sydney. Neighborhood social problem score and street-type, and some aspects of housing, predicted emotional and social adjustment. Before and after controls for family composition, social class and culture, children living in commercial streets, particularly in inner-city areas, stood out from all others in their feelings of loneliness, dislike of other children and feelings of rejection, worry, fear, anger and unhappiness. Children living in high social problems areas showed a pattern of social constriction rather than maladjustment. These results suggest not simply the influence of social class but genuine community socialization effects. Possible sources of, and mechanisms for, these effects are suggested.

A large literature has noted the many ways in which the characteristics of families influence the development of children (McCandless and Evans, 1975). Less attention has been paid to other aspects of the child’s environment. Recently, however, Bronfenbrenner (1979) and his colleagues (Cochran and Brassard, 1979; Garbarino, 1982; Garbarino et al., 1980; Bronfenbrenner et al., 1984) have drawn attention to the importance of the ecology in which child development takes place; for example the stressfulness of the physical environment, the presence or absence of supportive social networks, and the availability of services such as child care. These authors call on social scientists to pay more attention to ecological settings, noting the sparseness of empirical

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evidence linking these settings with family functioning and child development. Our aim in this paper is to present evidence that features of the family environment do to some extent influence the wellbeing of children and their social adjustment.

We focus on three levels of the child's immediate physical and social environment: the home, the street and the neighborhood. Our data are derived from interviews with members of 321 families living in Sydney. These families were resident in 18 neighborhoods which were selected according to a careful probability sampling strategy which maximized the differences in 'local community wellbeing', as measured by an index derived from 25 objective social indicators. Random selection of children from the rolls of schools servicing the areas provided a spread on the housing and street variables. Having thus selected families differing widely in terms of the quality of their environment, we ask the following questions. Do indices of children's social and emotional adjustment vary depending on the quality of the home, the street or the neighborhood? If so, is this simply because families with certain characteristics are more likely to live in particular environments, or do environmental factors have predictive power after taking account of family characteristics? Which aspects of the environment appear to be most important in influencing children, and what can be said about the processes through which these aspects achieve their impact?

Local environment could influence children's wellbeing in a number of ways. Rainwater (1966) distinguishes between human and non-human influences, and between direct and indirect paths of influence. Ways in which each of the four possible combinations could affect children have been proposed (e.g.: Gump, 1975; Rutter, 1981). Heavy local traffic for example could have both a direct influence (children frightened and frustrated) and an indirect influence via human mediation (parents become restrictive and nagging in an attempt to protect the child). The available evidence regarding any of these proposed effects is however somewhat limited. Where evidence exists, it refers mainly to the attitudes and behaviors of parents rather than to the experiences of children. For example, the influence of housing quality (Wilson and Herbert, 1978) and of a hostile social environment (Garbarino, 1982; Martin, 1970) on parental child-rearing practices have been described.
The method of our study parallels the five analytic steps proposed by Bronfenbrenner *et al.* (1984) for establishing a community effect on child development. Their first step, demonstrating variation in community structures, is built into our research design. Their second step, demonstrating psychological variations across communities, is investigated through correlations of environmental variables with child outcomes. By controlling for family social class, culture and family composition in our further analyses, we attempt to carry out steps three and four, namely establishing effects at a community (or environmental) level and distinguishing community processes of socialization versus selection. ‘Community socialization’ is defined by Bronfenbrenner *et al.* as the effect of living under particular kinds of community conditions; ‘community selection’ is defined as the processes which affect which groups move into the community, which move out, and which remain. They point to variation in social class composition between communities as the most common source of selection effect, which highlights the need to control for differences in social class composition before drawing conclusions about community effects. Accordingly, we have included family income, education and occupational status as control variables, in addition to measures of ethnic status and other family characteristics. Although the family measures included in our models do not cover complex variables like interaction patterns within the family, we justify our variables on the basis that they have been most commonly nominated as influencing children’s wellbeing (*Links, 1983; McCandless and Evans, 1975; Moen *et al.*, 1983).

The fifth and final step stipulated by Bronfenbrenner *et al.* (1984), identifying sources and mechanisms of community (or neighborhood) effects, is the most difficult, but we draw on details of our interviews as well as the statistical analyses to make some tentative suggestions.

**Outcome Measures and Indices of the Environment**

Following Bronfenbrenner (1979) and Garbarino (1982), three aspects of *children’s wellbeing and adjustment* are measured — life satisfaction, emotional adjustment and social adjustment. Most measures come from the child interview schedule developed by the U.S. Foundation for Child Development for community surveys of wellbeing and adjustment.
(Lash and Sigal, 1976). This measure has been used in a number of countries and extensive normative data are now available (Zill, 1988).

Four life satisfaction, four emotional adjustment and nine social adjustment indices were used. Children's satisfaction with four areas of life (self, friends, schoolwork and family) was measured using a set of five line-drawn faces with expressions ranging from very happy to sad. Once it was established that the child understood this to be a scale, he or she was asked to choose (serially) the face that best represented her feelings about each of the four areas. To measure emotional adjustment, children were presented with a set of faces representing worry, fear (being scared), anger and unhappiness. Once the correct choice had been made the question was asked “What about you? Do you (worry, etc.) about things: often, sometimes, hardly ever, or never?” A list of common sources of (worry, etc.) was then read to the child and she or he was asked to nominate which if any was true for her. In respect of fear a further question was asked: “Who is the person you are most afraid of?”

Social adjustment was measured using nine questions. (1) How many children do you play with, at school and at weekends, etc.? (scored numerically); (2) Do most of your friends know each another? (yes/no); (3) Do you have a best friend, or a number of friends you like about the same? (4) When children choose sides for a game are you usually: one of the first children picked, one of the last, or usually in the middle? (5) Do you ever feel lonely and wish you had more friends? (Often, sometimes, never); (6) Do you like most of the children in your class? (yes/no); (7) Who do you play with after school and at weekends? (friends, relatives, self, other); (8) Not counting your family, are there any grown-ups around where you live with whom you like to talk and spend time? (yes/no); (9) (Asked of parent) Compared to other children the same age, how well does [child] get along with other children? (much better, better, about the same, worse).

Of our three levels of environment, the associations between housing and human wellbeing have been most extensively documented. In line with this literature, four housing characteristics are included in our analysis — floor occupied, housing upkeep, occupancy type (owning or public or private rental) and playspace availability. It has been established that these four variables influence adult wellbeing and/or
parental practices (Bronfenbrenner, 1979; Gump, 1975). It is accordingly predicted that these four housing features will also be associated with children's wellbeing and adjustment, with children living in well-kept low-rise owner-occupied housing with adequate playspace being most satisfied with their lives.

Floor occupied was categorized as ground or above ground; housing upkeep as well-kept, equal to area; not well-kept, equal to area; worse than average for the area; and better than (mainly poor) area; occupancy type as welfare rental, private rental, owning or buying; and outside playspace was categorized as available or not. Interviewers noted housing type and upkeep and playspace availability following completion of the interview.

Compared with the evidence for housing, there is less evidence regarding the effects of street-type on residents, but a number of epidemiological studies have shown that adults with lower levels of adjustment and poorer mental health tend to be concentrated in pockets of disadvantage in certain poor-neighborhood streets that provide cheap rental accommodation above shops and close to industrial and commercial premises (Bagley et al., 1973; Vinson et al., 1976). It is predicted accordingly that children living in streets of a predominantly non-residential nature will also show below-average wellbeing and adjustment, especially if these streets are located in poorer areas with a high incidence of social problems. As with most of the housing measures, the nature of the street in the vicinity of the dwelling was recorded by the interviewer after the interview.\footnote{1}

Finally, it is predicted that children living in higher quality neighborhoods will show superior adjustment. Garbarino and his associates reported that parents living in high stress neighborhoods found children more difficult to bring up, and received less support from other adults (Garbarino, 1982). Garbarino used as his definition of neighborhood the smallest district for which the U.S. Census provides figures, and defined neighborhood quality in terms of district status on a composite of negative social indicators, including unemployment, crime and child abuse rates. Our approach is similar, with neighborhood defined as the catchment area for the local state primary school (a composite of several Census Collectors' Districts, or CCD's) and quality defined by areal scores on three census variables (percentage of workforce
unemployed, percentage of workforce unskilled, and number of divorced/separated per 1000 occupied dwellings) which in combination provide an excellent surrogate for a more complex measure of local community wellbeing derived by Vinson and Homel (1976) by principal components analysis of 25 social indicators (health, welfare, employment, education, income and crime) available from Australian official statistics.\(^2\)

The statistics used by Vinson and Homel (1976) were selected on the basis that they could "... be shown to be direct indicators of conditions which are defined as problems on the basis of commonly accepted values" (p. 6). Thus census statistics were not used unless they could be argued to be direct indices of undesirable conditions, for example, the rate of unemployment in an area. The geographical unit used by Vinson and Homel was the Local Government Area (LGA) within metropolitan areas and Statistical Subdivisions throughout the remainder of New South Wales (72 regions in all). All correlations between indicators were positive (mostly in the range 0.4 to 0.8), and the first principal component accounted for 40.2\% of the variance, with no other component accounting for more than 14.7\%. Restricting analysis to Sydney, the first component accounted for 50.9\% of the variance, with only three of the 25 indices having loadings falling below 0.5. Confirmatory factor analysis suggested that a one dimensional factor structure was a reasonable fit, with a mean residual of 0.09, but the use of a 'social problems factor' is in any case justified by the argument that the first principal component effectively captured what all indices measured in common.

Since the present study utilized areas smaller than local government areas, and since direct data on most of the 25 indicators were not available at the neighborhood level, it was necessary to use census statistics (available at the CCD level) to develop a surrogate index. The three selected census variables, when combined in a regression equation at the LGA level within Sydney accounted for 91.0\% of the variance in the social problems index. As a double check on the validity of the surrogate index direct information on appearances at lower courts (one of the indicators loading most heavily [0.93] on the social problems factor) was collected for the 18 neighborhoods sampled for the study. The correlation between appearances per 1000 of total population and the surrogate index was 0.85, an acceptably high value.
The usefulness of the community social problems score, whether estimated or actual, has been demonstrated by earlier analyses. It has been shown to be strongly associated with parents' and children's satisfactions with the neighborhood as a place for children to grow up in (Burns and Homel, 1986; Homel and Burns, 1986; Homel and Burns, 1985), with measures of local community solidarity (Burns and Homel, 1986), with child social networks and school behaviour (Homel et al., 1987), with biomedical indicators (Gibson and Johansen, 1979), with parental values (Burns et al., 1984), and with parents' locus of control (Vinson and Homel, 1976).

THE CONTROL VARIABLES

Ten family characteristics that have been shown to influence children's social and emotional adjustment were included. (1) Occupational status (7-point scale of Australian occupations [Congalton, 1969] with an additional category for unemployed. Where both mother and father were employed the higher status occupation was used, which was almost always that of the father); (2) and (3) paternal and maternal education (7-point scale); (4) family income (adjusted for the composition of the family [Saunders, 1980]); (5) maternal employment (full-time or part-time; not employed); (6) cultural background and (7) single parent status were collapsed into five categories: both parents native Australian born, both parents born overseas in a non-English speaking country, mixed marriages (one Australian born and one non-Anglo), one or both born overseas in an English speaking country and single parents (all of whom were women and most of whom were Australian born); (8) urbanicity of parents' background (both rural, mixed, both urban); (9) religion (8-fold categorization: Protestant, Roman Catholic, Greek Orthodox, other, with/without high religious commitment); (10) number of children in the family.

The child's age and sex were also included as control variables.

THE SAMPLE

The data come from a larger study of community and family interaction, involving 321 Sydney 9—11 year olds and their families. In order to obtain a sample that could be weighted so as to represent the total
Sydney population, but which also adequately represented the neighborhood variables under investigation, a three-stage probability sampling procedure was followed.

In the first stage, LGA's in Sydney were stratified according to the social problems index (high, medium or low) and according to whether they were inner or outer. Within each of these six strata, one LGA was selected with probability proportional to the number of 9—11 year old children. Within each selected LGA school feeder areas were divided into three strata reflecting different levels of estimated social problems and different proportions born in non-English speaking countries. Within each stratum one feeder area was selected, again with probability proportional to the number of 9—11 year old children, yielding a total of 18 feeder areas or neighborhoods served by 18 state schools and 17 Roman Catholic parochial schools. The target for each neighborhood was 20 complete family interviews. Within each school, the names of children were randomly selected from school rolls and letters sent home inviting the family to participate in the study. The average response rate over schools was 70.4%, yielding a sample of 164 girls and 157 boys, with between 14 and 21 families in each neighborhood. Children were interviewed at school during the latter part of 1978, and parents at home, on average six weeks later.

RESULTS

All analyses are carried out at the individual level (N = 321), not at the neighborhood level. We begin the analysis by describing the sample in terms of the environmental indicators, selected family characteristics and child outcomes. Following this we report the intercorrelations between the environmental variables, and their relationship with indicators of family socioeconomic status. It is demonstrated that although traditional measures of class, such as occupational status, are strongly associated with housing status and with area, the environment-family status correlations are not so high as to render any two measures interchangeable. This is followed by an examination of the power of the environmental variables to predict child outcomes, and then by a demonstration that for a number of outcome measures one or both of the two environmental variables, neighborhood social problems and
street-type, retain predictive power after the control variables are introduced.

Our major method of statistical analysis is hierarchical linear models analysis (McCullagh and Nelder, 1983). What this means is that we fit groups of predictors in a statistical model in sequence, asking at each stage how much additional variance in the measures of children's wellbeing is explained by each group of predictors over and above those already fitted in the model. Because we wish to establish that environmental variables retain predictive power even when the contribution of all other variables is taken into account, we always fit environmental measures last. Since it would require many tables to report the results of both the model fitting process and the interpretation of the models, we restrict our tables to those detailing the variances explained by groups of predictors, together with their levels of statistical significance (Tables III and IV). The aspects of the interpretation of the models most relevant to our investigation of ecological variables are summarized in the text.

In general (see Table III and IV) we fit our models in the order: (i) child's age and sex; (ii) the nine family variables (e.g.: occupational status); (iii) the four housing variables (e.g.: availability of outside playspace); (iv) street-type; and (v) neighborhood social problems. The theoretical basis for this hierarchy has been established already: there is a considerable literature pointing to the child's age and sex, to family characteristics and (to a lesser extent) to housing variables as critical determinants of a child's social and emotional adjustment, but the role of neighborhood-level variables is much less clear. Since the contribution of street and neighborhood characteristics is problematic, we consider the street-type and neighborhood problems measures fitted in both orders, and we also investigate the possibility of an interaction between them. An interaction would suggest that the effects of street-type on the wellbeing of children varies with the level of social problems in the neighborhood.

**Correlations among Predictor Variables**

Because of our sampling strategy, the sample was distributed more or less equally across the 18 suburbs selected for study, with an average of
18 families per neighborhood. Although poorer areas were deliberately over-represented, the majority (53.9%) of children lived in dwellings described by interviewers as very well kept, and on a par with the neighborhood standard. More than three-quarters (76.6%) of parents owned or were buying their house, with 10.6% living in welfare housing. Only 9.0% of families lived on an above-ground floor, and an even smaller number of children (5.3%) lacked access to outside playspace. The proportion living in streets which were not purely residential (consisting at least partly of commercial, wholesale or retail properties) was 12.1%.

As indicated in Table I, most of the environmental variables were significantly correlated with each other (although not so highly as to indicate multicollinearity). There were marked variations between neighborhoods in the quality and nature of housing and in street-type. The neighborhood social problems score had the highest correlations with other environmental variables, highlighting its status as a good general measure of quality of life at the local level. More than one-third (38%) of the children living in non-residential streets lived in the three inner-city high social problems suburbs included in the sample. The housing of families in the non-residential streets, and generally in the

\begin{table}
\centering
\caption{Intercorrelations of environmental variables}
\begin{tabular}{lcccc}
\hline
 & Social & Street & Floor & Housing & Occupancy \\
 & problems* & type & occupied & upkeep & type \\
\hline
Street-type & 0.38** &  &  &  & \\
Floor occupied & 0.39** & 0.08 &  &  & \\
Housing upkeep & 0.31** & 0.26** & 0.17 &  & \\
Occupancy type & 0.46** & 0.14 & 0.27* & 0.26* & \\
Outside playspace & 0.40** & 0.17* & 0.17* & 0.11 & 0.20* \\
\hline
\end{tabular}
\end{table}

\textit{Note:} Since all environmental variables except neighborhood social problems were measured at the nominal level, the correlations shown are Cramer's $V$, computed at the individual level ($N = 321$).

* Categorized as 18 neighborhoods.

* $p < 0.01$.

** $p < 0.001$. 
high social problems inner-city areas, tended to be of poorer quality (although respondents sometimes maintained their house better than other people in the neighborhood), was more likely to lack outside playspace, to be high-rise, and to be rented from a private landlord. Two high social problems neighborhoods on the outer fringes of the city had a high concentration of welfare housing.

Fewer than one family in five (18.1%) was in the top three status categories (mainly professional/managerial) and parental education levels reflected this distribution, with only 9.4% of mothers and 16.5% of fathers having completed a full secondary school syllabus. The rather high proportions of parents with only primary school qualifications (14.6% of mothers and 12.5% of fathers) was mainly due to the significant number of immigrants from southern Europe (about a quarter of the sample). More than one family in ten (11.6%) was headed by a woman. Income range was very wide, with welfare recipients receiving the lowest incomes.

Table II presents correlations between environmental and family variables. Neighborhood and house occupancy type were most consistently correlated with family characteristics. The moderate correlations with neighborhood support the conceptualization of the neighborhood social problems index as a variable separate from personal socioeco-

<table>
<thead>
<tr>
<th>Family characteristics</th>
<th>Social problems*</th>
<th>Street type</th>
<th>Floor occupied</th>
<th>Housing upkeep</th>
<th>Occupancy type</th>
<th>Outside playspace</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational status</td>
<td>0.31**</td>
<td>0.10</td>
<td>0.11</td>
<td>0.17</td>
<td>0.24**</td>
<td>0.18</td>
</tr>
<tr>
<td>Mother's education</td>
<td>0.28**</td>
<td>0.17</td>
<td>0.07</td>
<td>0.16</td>
<td>0.17</td>
<td>0.12</td>
</tr>
<tr>
<td>Father's education</td>
<td>0.31**</td>
<td>0.18</td>
<td>0.10</td>
<td>0.15</td>
<td>0.22**</td>
<td>0.13</td>
</tr>
<tr>
<td>Income*</td>
<td>0.08*</td>
<td>0.08</td>
<td>0.08</td>
<td>0.15</td>
<td>0.24**</td>
<td>0.16</td>
</tr>
<tr>
<td>Cultural background/ single parent status</td>
<td>0.32**</td>
<td>0.15</td>
<td>0.15</td>
<td>0.17*</td>
<td>0.27**</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Note: All correlations are Cramer's $V$, computed at the individual level ($N = 321$).

* Categorized as 18 neighborhoods.

b Divided into 5 equal sized categories.

* $p < 0.01$.

** $p < 0.001$. 

TABLE II
Correlations of selected family characteristics with environmental variables
nomic status, although the magnitudes of some correlations are under-

ated by the use of Cramer's $V^4$.

In general, residents of higher social problems areas (and those living in non-residential streets) were of lower socioeconomic status and were more likely to be non-English speaking born immigrants, but there was nevertheless considerable diversity within areas. Lower status, poorer families and single parent families were more likely to be renting their house, particularly in the private rental market. Non-Anglo immigrants had above average levels of home ownership.

_Treatment of Outcome Measures_

The distribution of scores was similar on all items to those obtained in the U.S. (Lash and Sigal, 1976). Scores on the four life satisfaction measures were skewed to the happy end, particularly in respect of family and friends. Scores on each item were accordingly dichotomized between the two happiest and the three less happy faces, yielding 31.2% unhappy with themselves, 48.3% unhappy with school, 7.2% unhappy with friends, and 5.3% unhappy with family. Scores on the four dichotomized items were totalled to give an overall life satisfaction score with an $\alpha$ reliability of 0.31 (this was equivalent to counting how many times a child gave an extreme response).

Scores on emotional adjustment were also skewed (although less so) with only a minority of children reporting that they were often worried (19.3%), afraid (12.8%), angry (16.5%) or unhappy (20.2%). Thus these scores were also dichotomized to separate the 'often' group from the remainder, and scores on the four items totalled. The $\alpha$ reliability of 0.51 reflects the fact that the emotional adjustment items were more highly correlated than the life satisfaction items ($\phi$ correlations ranged between 0.11 and 0.36).

In addition to the two summary measures, separate item scores were analyzed in order to investigate predictors of specific areas of life satisfaction and emotional adjustment. Although these specific items are at least as important to the goals of the research as the summated measures (Schuman and Presser, 1981), to conserve space the results of these analyses are used in the present report simply to clarify aspects of the analyses of the overall measures (in the discussion we also consider briefly some of the specific sources of worry, fear and anger).
The social adjustment measures, although having a conceptual unity, represented a more multidimensional array of feelings and behaviors than the life satisfaction and negative emotions sets (correlations ranged between zero and 0.37). Accordingly, rather than combining items into a single scale a multivariate linear model analysis was carried out, with all the items being dependent variables simultaneously.

Life Satisfaction

With the exception of the neighborhood social problems score, the variances explained by the environmental variables were on the whole small, and non-significant. The neighborhood score explained 3.3% of the variance in the overall life satisfaction score ($p = 0.013$), and was also a significant predictor of satisfaction with friends and family ($R^2 = 2.2\%$, $p = 0.05$ in each case). Levels of satisfaction were lower the higher the neighborhood problems score, the overall index score increasing monotonically from 0.65 for the lowest risk neighborhoods to 1.26 for the two highest risk inner city areas. The only other significant environmental predictors were housing upkeep, with children living in poorly maintained houses expressing more overall dissatisfaction ($R^2 = 3.2\%$, $p = 0.035$), and occupancy type, with children living in rented accommodation (welfare or private) being less happy with their families ($R^2 = 2.4\%$, $p = 0.05$).

These generally low correlations need to be viewed in perspective, since family characteristics were also weak predictors of life satisfaction scores: none explained more than 6% of the variance in any of these outcome measures. However, putting all significant correlations together a consistent pattern emerged, with lower levels of satisfaction reported by children (especially boys) of low-income families (especially immigrant Greeks and Cypriots, and single parent families) living in pockets of low grade private or welfare rental housing in areas with high social problem scores. Environmental variables make an important contribution to this overall picture.

It remains to test the hypothesis that environmental variables correlate with life satisfaction areas, over and above the contribution of the other variables. Total $R^2$ for the overall satisfaction score was 23.6% with all predictors included, of which 6.1% was contributed by the six environmental variables, fitted last (Table III). Thus environmental
variables increased the predictive power of the model by about one quarter. From Table III it can be seen that the quality of the neighborhood ceased to be significant when controlled for housing and for family variables, and that the housing and street-type variables are of marginal significance. Although the four housing variables (fitted last) contributed 3.9% of the 6.1% additional variance, partial F tests on the six environmental variables fitted in various orders (not shown in Table III) revealed that only street-type approached significance using a nominal significance level of 0.025 ($R^2$ fitted last = 1.3%, $p = 0.032$).

This result is a little surprising, since the neighborhood problems score was the most consistent predictor on its own (Table I), but it appears that the effects of this variable can be explained via its correlations with family education, occupation and income (Table II). On the other hand, when allowance is made in the regression for the presence of low income and immigrant groups in residential streets, the effects of street-type become much clearer. Children living in streets described as predominantly industrial or commercial recorded on
average 0.35 more areas of dissatisfaction than residential street children (0.4 of a standard deviation), and (taking all other factors into account) were more likely to express unhappiness about their families ($R^2$ fitted last = 1.7\%, $p = 0.018$).

As noted above, a substantial number of children living in non-residential streets came from high problem neighborhoods in the inner city. It is interesting to ask whether these inner city children are responsible for the effect described above, or whether living in a commercial or industrial street had the same effect across all areas. To answer this question, the interaction between street-type and risk was investigated (Table III). Adjusted for all other variables, the interaction was not significant for overall life satisfaction score ($p = 0.24$), although there was evidence that children living in industrial streets in the highest problem areas were particularly unhappy about their families (for the interaction, $R^2$ fitted last = 3.8\%, $p = 0.006$).

In summary, the expected disadvantages associated with low income, low status and a non-Anglo background appear to be exacerbated to some extent by residence in predominantly non-residential streets, many of which are located in high social problems inner city localities.

**Emotional Adjustment**

The most consistent predictor of negative emotions was not the social problems index but street-type. Children living in non-residential streets consistently reported more worry, fear, anger and unhappiness than other children, with $R^2$ values ranging from 2.1\% for fear to 5.4\% for the overall adjustment index. All these values, except that for happiness with life generally ($R^2 = 1.0\%$), were significant at 0.01. Poor housing was also associated with negative outcomes, particularly increased worry ($R^2 = 3.0\%, p = 0.049$), but this effect did not hold after controls for family characteristics (Table III). No other environmental variables were significant predictors of any of the emotional adjustment measures.

A number of non-environmental predictors were also important, with $R^2$ values of the same order of magnitude as that of street-type. Very high negative emotion scores were registered by children from low income families, from the lowest (unskilled) occupational status
families and from Greek and Cypriot children (for whom worry seemed the main problem). Low paternal education was associated with worry and fear, while low occupational status and low income correlated with higher levels of fear. Girls more often reported getting angry than boys, and children from large families were more likely to report less overall happiness with life.

Total $R^2$ for overall emotional adjustment was 25.4%, of which 5.7% was contributed by the six environmental variables (Table III). Once again street-type was the most important environmental predictor, with an $R^2$ fitted last of 3.1% ($p = 0.001$). Neither housing nor neighborhood social problems approached significance in any order of fit. Living in a non-residential street corresponded on average to an emotional adjustment score 0.59 units higher, or 0.6 of a standard deviation. However, this time there was also an interaction between street-type and the neighborhood social problems score, such that non-residential street children living in high-risk suburbs were particularly likely to report lower levels of adjustment ($R^2 = 3.7\%$ for the interaction fitted last; $p = 0.004$). This interaction also held for three out of the four individual items, adjusting for all other variables (worry: $p = 0.018$; fear: $p = 0.016$; life: $p < 0.001$).

The picture that emerges is of a group of poor, low status families whose social disadvantages are compounded by living in undesirable streets in high social problems neighborhoods. Thus for example the most fearful children lived in non-residential streets in high social problems neighborhoods, had fathers of unskilled status and poor education receiving a low income, and were girls.

**Social Adjustment**

Four of the environmental measures were significantly associated with social adjustment items: neighborhood social problems, street-type, housing upkeep and availability of playspace. The higher the neighborhood problems score the less likely children were to like most of their classmates ($R^2 = 5.3\%$; $p = 0.001$), and the more likely they were to have one best friend rather than to like a number of friends equally ($R^2 = 3.2\%$; $p = 0.020$). A plotting of these two items against the social problems scores of the 18 neighborhoods showed that it was the two
lowest risk and the four highest risk neighborhoods that stood out from all others. Children in the highest problems area differed markedly from those in the second highest, and there was a further gap between this and the next two highest. In the highest problems neighborhood barely half (53%) of children liked most of their classmates, compared to an average of 88% over all other areas. Best friends were reported by 47% of children in the three highest problems areas, compared to only 21% in the three lowest problems areas.

The children living in commercial streets were more likely than other children to describe themselves as often feeling lonely (24% versus 6%; $R^2 = 3.5\%$; $p = 0.001$), and described themselves as less readily chosen when teams for games were being picked ($R^2 = 3.5\%$; $p = 0.001$). Almost one quarter (24.3%) of children living in commercial streets but only 9% in residential streets reported that they were “one of the last picked” for games. The children from commercial streets were also less likely to like most of their classmates (11.0% versus 24.3%; $R^2 = 1.8\%$; $p = 0.002$), an understandable reaction to what appears to be a pattern of rejection by peers.

Correlations with housing were generally not as marked as for the neighborhood indices. Children who lived in homes without outside playspace were less likely to play with friends out of school (47% versus 71%; $R^2 = 1.4\%$; $p = 0.039$), were considered by parents to get along less well than others with other children ($R^2 = 1.3\%$; $p = 0.048$), and were less likely to like their classmates ($R^2 = 1.6\%$; $p = 0.029$). With respect to housing upkeep it was the children living in housing worse or better than that of their neighbors who presented the most negative picture, but since these correlations did not survive in the linear model they are not described further.

A further six non-environmental variables were also significant predictors. However, in the multivariate analysis only occupational status survived, so to shorten the discussion only its effects will be described. Occupational status was associated with the number of friends that the child reported playing with regularly ($R^2 = 5.9\%$; $p = 0.012$) and with the child's being friendly with adults outside the family ($R^2 = 7.5\%$; $p = 0.001$). The mean values indicate that it is the children in the highest occupational category who stand out on these items. This group of children nominated an average of 9.2 regular
playmates, compared with a range of 5.2 to 6.7 among the children of other occupational groups, and were more likely to be friendly with non-family adults.

In contrast to the life satisfaction and emotional adjustment analyses no summary measure of social adjustment was devised, since the items did not easily form a summated scale. Instead a multivariate analysis was carried out, with all nine measures being analyzed simultaneously as dependent variables. In a multiple regression or linear model with a single dependent variable, $R^2$ is an appropriate measure of the predictive power of the model, and partial $F$ tests are used to test the significance of individual predictors or groups of predictors. In a multivariate regression model a commonly used test statistic is Wilks' $\Lambda$ ('lambda'), and $1 - \Lambda$ can also be used as a measure of predictive power, when it is referred to as $\eta^2$ ('eta squared') (Tabachnick and Fidell, 1983).

The full multivariate model with all predictors included had high predictive power ($\eta^2 = 1 - \Lambda = 94.4\%$, $p = 0.001$), and the contribution of environmental factors is shown in Table IV. Table IV should be

<table>
<thead>
<tr>
<th>Predictor set</th>
<th>No. of terms</th>
<th>Degrees of freedom</th>
<th>$\Lambda$</th>
<th>Variance explained (%)$^b$</th>
<th>$p$</th>
<th>Critical $p^c$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child's age and sex</td>
<td>2</td>
<td>3</td>
<td>0.858405</td>
<td>4.7</td>
<td>0.411</td>
<td>0.049</td>
</tr>
<tr>
<td>Family variables</td>
<td>9</td>
<td>37</td>
<td>0.140316</td>
<td>65.3</td>
<td>0.013</td>
<td>0.204</td>
</tr>
<tr>
<td>Housing</td>
<td>4</td>
<td>8</td>
<td>0.613687</td>
<td>15.4</td>
<td>0.047</td>
<td>0.096</td>
</tr>
<tr>
<td>Street-type</td>
<td>1</td>
<td>1</td>
<td>0.925216</td>
<td>2.4</td>
<td>0.091</td>
<td>0.025</td>
</tr>
<tr>
<td>Nd. social problems$^a$</td>
<td>1</td>
<td>3</td>
<td>0.803667</td>
<td>6.8</td>
<td>0.031</td>
<td>0.025</td>
</tr>
<tr>
<td>Nd. social problems$^a$</td>
<td>1</td>
<td>3</td>
<td>0.802056</td>
<td>6.9</td>
<td>0.028</td>
<td>0.025</td>
</tr>
<tr>
<td>Street-type</td>
<td>1</td>
<td>1</td>
<td>0.927042</td>
<td>2.3</td>
<td>0.104</td>
<td>0.025</td>
</tr>
<tr>
<td>Nd. x street-type</td>
<td>1</td>
<td>3</td>
<td>0.841192</td>
<td>5.3</td>
<td>0.221</td>
<td>0.025</td>
</tr>
</tbody>
</table>

Note: Neighborhood social problems and street-type are shown fitted in two orders.

$^a$ The neighborhood social problems index was expressed as a cubic polynomial in the model to allow for possible non-linearities.

$^b$ The variance explained is the percentage of the trace of the full model accounted for by the trace of each family of predictors in the order fitted (and so the percentages add to 100).

$^c$ Based on a nominal significance level of 0.025 for each term.
read like Table III, with the "variance explained" column replacing $R^2$ (these variances are based on the "trace" criterion and add to 100%). The interaction between street-type and neighborhood social problems score was not significant, but both housing variables and the problems score made significant contributions adjusted for family and child variables. Environmental factors contributed 30.0% of the variance explained by the multivariate model. The role of environmental factors was further clarified when unnecessary predictors were eliminated from the model, since only four variables were significant and three of them were environmental. The reduced model had an $\eta^2$ of 51.3% ($p = 0.002$) and consisted of street-type (11.7% of the explained variance, $p = 0.016$, fitted last), neighborhood social problems (26.8%, $p = 0.014$), outside playspace (9.9%, $p = 0.047$) and occupational status (51.6%, $p = 0.030$).

In summary, the zero-order correlations and the reduced multivariate model suggest that street-type is a good predictor of social as well as of emotional adjustment. The social risk level of the neighborhood — a somewhat less immediate layer of the child's ecology — is associated with breadth of friendship networks. The small group of children living in premises without outside playspace do not present the picture of loneliness and unpopularity that marks the non-residential street children, but they do miss out on out-of-school peer activities. It is noteworthy that the only non-environmental indicator to retain predictive power was occupational status, and that it was also related to breadth of friendship networks, although in a fashion distinct from the neighborhood variable.

**DISCUSSION**

The findings demonstrate the value and feasibility of applying ecological concepts to the study of children's wellbeing. In answer to Garbarino's (1982) call for a means to "identify communities and neighborhoods with characteristics that make them high risk places for families" (p. 164), one clear guideline at least can be offered — look to the children living in pockets of disadvantage, particularly in commercial and industrial streets. The small minority of such children, especially those in inner city areas, stood out from all others in their feelings of
loneliness, dislike of other children, feelings of rejection, worry, fear, anger and unhappiness and dissatisfaction with their lives and with their families in particular.

What interpretation is to be put on this finding? Is it something about the families that come to reside in such areas, or the effect of the neighborhood itself that affects how children feel about their lives? We have attempted in the analyses to distinguish community selection effects from those of community socialization, but clearly we have not been able to include all aspects of families which could represent genuine selection effects. However, a detailed look at individual families in the sample suggests that the two influences can be (and perhaps usually are) entwined in complex ways.

An example is the daughter of a family living above a drapery shop in which both parents worked long hours. The parents were working hard to provide their children with a better future, but because of the nature of the area insisted that the children stay close to home at all times. The ten-year-old daughter had few playmates, felt very lonely and isolated and often angry, especially about "always staying home and never going out". These could be regarded as community socialization effects. Shopkeepers were in fact well represented among the non-residential street families, often lived above the shop, worked long hours, and experienced considerable stress. They were frequently of limited education and a number were immigrants, some with limited command of English. Other low-income families lived nearby in rundown premises available at relatively low rents. These latter patterns could all be regarded as the result of community selection processes.

Not all of the children involved of course fitted the picture we have been describing. Even in the highest problem neighborhoods, some children living in industrial streets were as happy and sociable as any in the sample. For significant numbers however, family and neighborhood disadvantages combined to restrict their social life, alienate them from school and classmates, and burden them with worries about the welfare of their often vulnerable families. These children constituted the most disadvantaged group in our sample. They were a modest minority but it should be remembered that the sample included only those who accepted our invitation to take part. There was evidence from teachers and other sources that the least coping families were over-represented among the non-respondents.
The quality of the neighborhood had an impact on our families, but of a somewhat different kind from street-type. Those children who lived in high social problem areas, but not necessarily in streets with a concentration of commercial or retail properties, showed a pattern of social constriction rather than maladjustment. They were less likely to like most of their classmates, more likely to concentrate their affections on one best friend, less happy than average with their friends and less likely to be regarded by their parents as getting along well with other children. The association with neighborhood was not however linear. In the twelve ‘middling’ neighborhoods, there were no differences in the children’s self-reports. It was only in the highest problems areas, and in particular in the very highest, a rundown inner city neighborhood, that the pattern of social constriction became apparent. Conversely in the two lowest risk areas, which were spacious and fairly new housing estates on the fringes of the city where the children had access to a wide range of out-of-school activities, social adjustment was above average. These children were particularly likely to have more than one close friend.

It seems then that ‘ordinary’ life in residential areas in today’s Western cities promotes a general positive attitude towards other children, but that growing up in a rough neighborhood constricts these positive attitudes, and increases the likelihood that a single person will be selected as an intimate. It also suggests that growing up in a privileged semi-rural environment dilutes the need for such close exclusive friends, perhaps by promoting alternative affective ties (one child commented that “because I’ve been brought up with animals I love them as well as my friends”).

Bronfenbrenner et al. (1984) have stressed the importance of identifying those features of a community which influence residents. The interview data suggest that with respect to the families living in commercial streets aspects of both the social and physical environment are important. For example, parents living in these streets were more likely to complain about dangerous and noisy traffic, odors, smoke or gas, junk in the streets and dangerous places for children to play like abandoned buildings and open pits (Burns and Homel, 1986). In addition, they were more likely to complain about undesirable people like drunks and tough older kids in the locality, and about neighborhood crime. All these elements could make parents more protective of
their children, and could impinge directly on the children as well (Homel and Burns, 1986).

By contrast with the commercial street environment, our hypothesis is that the macro-neighborhood has an influence through more subtle social processes. The higher risk areas tend to be characterized by fewer contacts with neighbors and with local relatives, and especially by a lower level of involvement in community groups (Burns and Homel, 1986). Probably partly as a consequence of this (Janowitz and Kasarda, 1974), parents in these neighborhoods are much more likely to feel alienated from the local community. Overall there is less consensus on values in high problem areas and more conflict between families. In view of these attitudes and patterns of interaction involving parents, our finding of social constriction among the children is not surprising. Once again the children are probably influenced both by their parents' attitudes and directly by a less friendly social environment (Homel and Burns, 1986). The suggestion of direct effects on children is of some theoretical significance, since the available evidence on community effects tends to point more to a two-stage sequence from community to family to child (Bronfenbrenner et al., 1984).

From the point of view of establishing the nature of environmental effects, it is of some significance that the housing variables were less powerful predictors than the two broader environmental variables, particularly after controlling for family social class and cultural background. This is an interesting finding, given the importance of housing variables in predicting parental satisfaction with the community (Rossi, 1972; Marans and Rodgers, 1974; Burns and Homel, 1986). However, it should be noted that housing in Sydney probably does not exhibit the extremes in quality which characterize some European and North American cities (welfare housing for example is mostly safe and clean and not high-rise). Moreover the worst housing is sometimes concentrated in particular micro-neighborhoods (Marans and Rodgers, 1974), and so inferior housing may in some cases act as an alternative predictor of residence in a pocket of disadvantage (Table II).

Nevertheless the findings concerning playspace point to one mechanism whereby children can be directly affected by the nature of the dwelling. The children most likely to lack playspace were those living in inappropriately designed multi-story dwellings in high problem areas.
These children, like high-risk area children in general, were rated by their mothers as less socially skillful than average, and had fewer positive feelings towards their classmates. In addition, however, they were isolated by the nature of their accommodation from out of school peer play — a telling example of how poor architectural design can add to the disadvantages suffered by children growing up in underprivileged areas.

More evidence concerning the sources of environmental effects, and their mechanisms, can be gleaned from an examination of the qualitative data relating to sources of worry, fear and anger. Perhaps it comes as no surprise that the girls reported different kinds of fears and worries to the boys, as this sex difference has been noted by researchers since the 1920s (McCandless and Evans, 1974). More central to the study's aim was the finding that some of the more socially-inspired fears (for instance of staying home without adults as protection, of being attacked on the streets, and of father) were more common among the girls in the high problems areas and those living in commercial streets. Angry feelings, too, were more commonly reported by girls, and anger at teasing from boys was particularly common among girls resident in high problem neighborhoods and in commercial streets. This interesting finding suggests that early sexual hostility and hazing is a feature of high-risk neighborhoods. In general girls in disadvantaged areas seem more vulnerable to sexual oppression, both through their father and through direct contact with other males in the neighborhood — boys as well as men.

The family's social class, while naturally correlated with the quality of the environment in which the family lived, showed a number of independent effects on children, with most of the discrimination coming from the extremes of the distributions of occupational status, education and family income. Since these findings lie outside the main concern of the present paper, they will not be further discussed, except for one instance that is relevant to ecological concepts. The incidence of fear and worry is predicted by both street-type and by fathers' occupation and education, with occupation by far the most powerful predictor of children's level of fear. The children of the least skilled fathers stand out from all others in feeling "often afraid" and the interview material shows that part of this fear is for the safety of parents working in
dangerous environments — for example as taxi drivers and in factories with poor safety conditions.

The present data demonstrate the importance of environmental variables for understanding the emotional and social wellbeing of children. Sociologists and psychologists have tended to under-rate the importance of locality and to claim that social class and parental characteristics are the crucial variables determining life style and development (Bronfenbrenner, 1979; Pahl, 1973). This seems too limited a perspective.

NOTES

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1 There are no direct measures available of the reliability of the interviewer ratings of the dwelling or of the type of street. However, interviewers were required to complete that section of the questionnaire while still in the neighborhood, and detailed categories for each question were provided. For example, categories for street-type were based on one block, both sides of the road, and comprised residential only; residential with one or two stories only; three or more commercial properties, mostly retail; three or more commercial properties, mostly wholesale or industrial; and ‘other’. Interviewers were encouraged to provide a detailed description under ‘other’ if the above categories did not appear to fit.

2 Our definition of neighborhood corresponds to what Marans and Rodgers (1974) call ‘macro-neighborhoods’, while our distinction between residential and non-residential streets corresponds roughly to their ‘micro-neighborhood’. Marans and Rodgers suggest that these environments, together with the larger community and the dwelling, constitute a set of concepts which comprise the residential milieu of an individual. While recognising the importance of variations in the quality of the dwelling, we assume that because all our families lived in Sydney community level effects (if any) are more or less standardized.

3 ‘Inner’ was defined as less than one hour driving time from the central business district at peak hour.

4 There was a higher correlation between the neighborhood social problems score and occupational status using Pearson’s $r$ ($r = 0.49$, $p = 0.000$, excluding 19 respondents not in the workforce), with quite high concordance between the highest and lowest scores, but considerable spread in the middle range. The Pearson correlation of neighborhood with income was also higher, but still moderate, at $\approx 0.27$ ($p = 0.000$).

5 The significance of each group of predictors can be assessed by comparing the $p$ value with the critical $p$ for the group. The critical $p$ is approximately 0.025 multiplied by the number of predictors in the group. The more predictors in a group, the less
stringent the p value required to reject the null hypothesis and conclude that at least one predictor in that group is significant at about the 0.025 level. (The 0.025 level was chosen as a compromise between 0.05, which is too high with a large number of predictors, and 0.01, which is rather too stringent with a sample size of only 305.)

The reduced model was obtained by reducing the families of predictors in the order depicted in Table IV, and then checking eliminated variables for significance. The adequacy of the reduced model was checked against Aitkin's (1974) criterion. Aitkin's method allows many hierarchical fits to be performed while keeping the overall Type I error rate below a fixed level (in this case, $1 - 0.975^{17} = 0.35$, using a nominal significance level of 0.025). According to this criterion, outside playspace should have been omitted from the model, but it was retained because of its theoretical interest and because it was recognized that with only 5.3% of the sample without outside playspace tests on this variable had limited power.

BIBLIOGRAPHY


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