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Early Environmental Experiences and School Achievement in the Second Grade: An Israeli Study

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This study was an attempt to replicate, in an Israeli sample, findings from American studies regarding the relationship of demographic variables, the quality of the early environment, and sociocognitive growth in children. In the first part of the study, the environment of 178 2-year-old Israeli children was assessed. Families with higher social status (SES) and fewer children were significantly more likely to provide enriching environmental experiences to their 2-year-old. In the second phase of the study, 149 of the sample were located and their school achievement assessed at the end of Grade 2. Path analysis revealed that the family's SES and number of children had both a direct and an environmentally mediated effect on children's achievement in school, and that differences in the quality of the environment at 2 years accounted for a large part of the variability in achievement both between and within social classes. As in the American studies, free exploration of developmentally challenging objects, and in particular fine-coordination toys and picture-books, was an important feature of a good rearing environment. In addition, contact with peers and extrafamilial care in the 3rd year were found also to have some unique predictive power of sociocognitive performance. The results are congruent with a model that SES and family configuration have a decisive effect on child-rearing practices and the latter, in turn, determine the course of children's cognitive and social development. The possibility was entertained that class-related differences in parental concepts of age-appropriateness contribute to the SES differences in the type of environmental experiences accorded to young children.

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INTRODUCTION

The goal of the reported study was to replicate, in an Israeli Jewish sample, the findings from mostly North American studies regarding the relation of demographic and environmental variations as predictors of school achievement.

It has been well established, in Israel as well as elsewhere, that the family background predicts children's cognitive functioning. Usually, children of parents with lower education, lower work status, and lower income exhibit a cognitive deficit in childhood and do less well in school (e.g. Eels, Davis, Havighurst, Herrick, & Tyler, 1951; Farran & Ramey, 1980; Hertzig & Birch, 1971; Lieblich, Ninio, & Kugelmass, 1972; Thorndike, 1962). In addition, the structural characteristics of the family influence cognitive functioning as well: In general, earlier-borns and children from smaller families do better on cognitive tasks (Gottfried & Gottfried, 1984; Johnson, Breckenridge, & McGowan, 1984; Moore, 1968; Rees & Palmer, 1970; Zajonc, Marcus, & Marcus, 1979), although some negative findings have been reported as well. In Gottfried and Gottfried (1984) the number of siblings did not significantly predict the 42-months IQ, nor did it predict the 24- and 36-months IQ in Johnson et al. (1984).

The family's ethnicity is also a predictor of children's intelligence and school achievement. In the Jewish sector of Israeli society, children of non-Western origin, namely from Asian and North African ethnic groups, usually do less well in school than children of European origin (Klein & Eshel, 1980; Minkovitz, Davis, & Bashi, 1980; Ortar, 1967); and the former score below the latter on standardised intelligence tests (Lieblich et al., 1972; Smilansky, Shephatia, & Frenkel, 1976). Since there are considerable socioeconomic status (SES) differences between these ethnic groups, it is possible that the ethnicity effect is explainable on these grounds. Although Lieblich et al. (1972) found that ethnicity affects intellectual achievement in childhood independently of the family's socioeconomic status, it is possible that the larger sibling sizes in non-Western families, rather than their ethnicity *per se*, is the explanation of the non-Western children's lower level of achievement when SES is held constant.

As to the process by which such demographic variables influence intellectual attainments, it has been claimed that the demographic variables are distal markers of proximal variation in environmental experiences, while the latter are causally related to cognitive growth (Bloom, 1964; Deutsch, 1973; Walberg & Marjoribanks, 1976; Wolf, 1966; Yarrow, Rubenstein, & Pedersen, 1975). The results of previous studies have been mostly congruent with such a model. It has been consistently established that the quality of young children's early environments is a covariant of the family's

SES and of the family configuration. As a rule, the higher the families' SES, the better quality the environment that the family provides for its infants and young children (Barnard, Bee, & Hammond, 1984; Bradley & Caldwell, 1984; Bradley, Caldwell, & Elardo, 1977; Gottfried & Gottfried, 1984; Johnson et al., 1984; Siegel, 1984; Walberg & Marjoribanks, 1976). Moreover, the 2- to 3-years' environment typically predicts between 25% and 40% of the variance in 3- to 5-years intelligence or cognitive scores (see Gottfried, 1984 for a review), and about the same proportion of the variance in 1st- to 3rd-grade school achievement (Bradley & Caldwell, 1984; Gottfried, Gottfried & Guerin, 1986 (Note 1); Hammond & Bee, 1983 (Note 2); Moore, 1968). In most previous studies these predictions were better than those achieved by SES or parental education (Gottfried & Gottfried, 1984; Hess, Holloway, Dickson, & Price, 1984; Marjoribanks, 1972; Siegel, 1984). Entering environmental variables before demographic ones into multiple regression analyses usually reduced considerably the latter's contribution to the prediction of cognitive growth (Bradley & Caldwell, 1984; Gottfried & Gottfried, 1984; Hess et al., 1984; Siegel, 1984; Whiteman, Brown, & Deutsch, 1967), although seldom to non-significance. In summary, the empirical findings are generally supportive of the claim that demographic effects are mediated by environmental variation, although it appears that apart from their environmentally mediated effects, they also contribute independently to prediction of school success and cognitive growth.

As well as accounting for some of the effects of the demographic variables on cognitive growth, environmental measures are also successful in accounting for some of the individual differences among children from the same type of families. Environmental measures usually added to the prediction when forced into multiple regression equations after SES or parental education (Barnard et al., 1984; Bradley et al., 1977; Jordan, 1978; Marjoribanks, 1972; Moore, 1968; Siegel, 1984), and they were able to account for variability in cognitive achievement among middle-class children (Gottfried & Gottfried, 1984). It is possible, thus, to identify on the basis of previous findings three types of effects on children's cognitive growth: some effects of demographic characteristics mediated by environmental covariation; some effects of demographic characteristics not mediated by environment; and some effects of environmental variation independent of the family's SES or composition.

The attempt to replicate this pattern of previous findings in an Israeli sample is of some special interest. Although the Israeli findings relating certain ethnic and socioeconomic backgrounds to inadequate cognitive and academic functioning in children are similar to findings from other societies, the similarity is apparent rather than real. First, the scope of the problem of so-called culturally deprived children is much greater in Israel

than in, for instance, the United States. Rather than being a minority, children of Asian–North-African origin comprise about 60% of the population of elementary schools. Second, many of the sociological risk factors of the culturally disadvantaged population in, for instance, the United States, do not operate in the Israeli group. This population is much more traditional and family-oriented than the comparison groups in the U.S.A.; marriage rate is very high and divorce rate low, single parenthood is extremely rare and teenage single parenthood virtually non-existent. The sociological picture is dissimilar enough from that of cultural risk groups previously investigated in order to impart an added interest to the cross-cultural replication of the previous results.

In the reported study, the environmental opportunities of a demographically heterogenous sample of urban Israeli 2-year-old children were assessed in an interview with their mothers. Path analysis was then employed to test a causal model according to which the quality of the early environment mediates the effect of demographic indexes such as ethnicity, SES and number of children, on the sample's school achievements at the end of the second grade, and also accounts for some of the individual, within-class, variability in achievement. The study focused on the age of 2 years because according to some authorities (e.g. Smilansky et al., 1976), around this age there is a sharp deterioration in the quality of environment accorded to children in lower-class families of non-Western origin in Israel.

The environmental assessment instrument developed for the purposes of this study is similar in design to existing instruments such as the HOME Inventory (Caldwell & Bradley, 1979), the PHSI (Wachs, 1976 (Note 4), the Home Environment Interview (Wolf, 1966) or the VEC (Gottfried & Gottfried, 1984), except for two features reflecting uniquely Israeli conditions. First, the typical urban family in Israel lives in a medium-sized apartment building rather than in a house, and has a very close-knit relationship with friends, neighbours, and the extended family. Young children as a rule are exposed to other children from an early age and spend relatively much time in their company. It is one of the goals of this study to find out whether such early social relations are beneficial to later school adjustment, and in particular to the children's relationships with classmates. Moreover, some type of group care is very much the norm rather than the exception for 2-year-olds; except for children of mothers employed outside the home, who may have been in day-care from the early months as a practical arrangement, it is quite customary for mothers who are not employed outside the home to enroll their 2-year-olds in a playgroup or day-care centre for the mornings, in order to vary the children's opportunities for intellectual stimulation and social contact with peers. However, alternative forms of secondary care exist as well: A private childminder may take care of the 1- or 2-year old, either in the

child's home or in her own, sometimes as her only charge and sometimes as one of a small group of young children. In other cases a relative, grandparent or sister-in-law, may care for the child while the mother is working. It was hypothesised that such settings may offer opportunities for social–cognitive growth beyond that provided by the family, in three conditions: that the care is outside the child's home, thus increasing the range of places the child spends time in; that the setting is well-equipped with age-appropriate toys and picture-books that do not belong to the child; and that the child is taken care of in the company of at least one age-mate, thus providing opportunities for social skills acquisition. It will be seen whether such out-of-the-home environmental opportunities, in the children's second and third year, predict better school achievement in the second grade. Some preliminary findings from a Canadian study (Strayer, 1987 (Note 3)), suggest that they might: Strayer found that day-care experience and the diversity and quality of early social experience was associated with more rapid emergence of complex problem solving styles in young children.

METHOD

Subjects

The Original Sample. The environmental assessment sample consisted of 178 2-year-old Jewish children born within a month, whose mothers were interviewed in the children's 21st to 24th months. The sample was drawn from the register of live births in Jerusalem, and consisted of the first 178 of all children on the register for the relevant month whose mother could be contacted and who agreed to participate in the study. Originally, 191 families were located and contacted by mail and later by telephone or in person, 5 months prior to the children's 2nd birthday. Of these, 13 (6.8%) refused to be interviewed. Two children with severe developmental problems were dropped from the sample, and two twin siblings included, to make up the final 178 sample.

The Follow-up Sample. One hundred and forty-nine of the original sample were located when the children reached the end of second grade. Thirteen (or 8.7%) families refused to participate in the follow-up phase of the study. These children were nevertheless included in the follow-up sample since information on their grade placement (see Instruments) was available from the educational system.

The other 136 families gave their written permission to have their 2nd graders tested for reading comprehension and arithmetic skills at home, and the child's teacher approached for a rating of the child's school

TABLE 1
Demographic Characteristics of the Original and the Follow-up Sample

Variables	*Mean [SD] or frequency (%) in sample*	
	Original at 2 years	*Follow-up at 8 years*
Sample size	178	149
Age at assessment (weeks)	94.6 [4.9]	94.4 (4.9]
Gender, female	48.3%	49.0%
Ethnicity		
Europe–America	42.3%	37.8%
Asia–Africa	41.1%	43.9%
Mixed Western–non-western	16.6%	18.2%
Place of birth of parents		
Both parents born in Israel	35.4%	36.9%
One parent born in Israel	33.7%	30.9%
Neither parent born in Israel	30.9%	32.2%
SES (scale 4–20)	12.2 [4.1]	12.0 [4.1]
Middle class (SES > 16)	22.5%	22.8%
Lower middle class (11–15)	42.7%	39.6%
Lower class (<10)	34.8%	37.6%
Mothers' education (years)	12.0 [3.7]	11.8 [3.9]
Fathers' education (years)	13.0 [3.6]	12.8 [3.6]
Mothers' occupational status (on 5-point scale)	2.1 [1.4]	2.1 [1.4]
Fathers' occupational status	3.7 [1.0]	3.7 [1.0]
Maternal employment rate	50.3%	50.0%
Mothers' age at delivery	28.0 [4.8]	28.2 [5.0]
Number of children in family	2.8 [1.9]	2.8 [1.9]
Birth order	2.7 [1.8]	2.6 [1.9]
Firstborns	32.6%	33.6%
Age-gap vs closest older sibling (months)	34.6 [23.0]	34.9 [21.7]
Have younger sibling at 2 years	14.6%	14.1%

achievements. Nine of the children were only tested at home, because their schools refused to cooperate. Since these children were enrolled at non-state-regulated religious schools where the statewide arithmetic curriculum was not implemented in the first two grades, only their reading comprehension test results were used in the study. Twelve children were not tested, although their teachers completed a rating scale on them: six because they moved to another city in Israel and the budget did not allow us to travel to test them; three because the children refused to be tested, and three because of technical problems. Thus, full information was obtained on 115 children, a total of 127 teacher's ratings were obtained, and a total of 124

tests were carried out. Information about normative class placement was obtained about 149 children.

Table 1 presents the demographic characteristics of the assessment and the follow-up samples. Socioeconomic status (SES) was a four-factor summary score based on both parents' education and employment, each on a 5-point scale (cf. Lieblich et al., 1972). The five levels of the occupations scale were (1) no occupation, housewife; (2) unskilled and semiskilled; (3) skilled manual, low-level clerical, salesperson; (4) white-collar, teacher, technician; and (5) professional and managerial, artist.

Inspection of the demographic characteristics of the population of all the families in Jerusalem who had children in the same year (Harlap, Davies, Grover, & Prywes, 1973) revealed that the sample was highly representative of Jerusalem births in that year regarding the sex ratio of the infants, number of siblings, mothers' and fathers' ethnic origin, Israeli or foreign birthplace of parents, and mothers' and fathers' years of education.

A MANOVA comparing the follow-up sample with the subjects who were lost because they had not been located, on sex ratio, mother's and fathers's education, SES, ethnicity, emigrant status, mother's age and number of children revealed that subject loss in the follow-up phase did not bias the sample's demographic characteristics (multivariate $F(8,162) = 1.09$, $P > 0.05$). Comparing the 115 children on whom full information was obtained with the 34 children on whom only partial information was obtained, on the same characteristics, (multivariate $F(8,135) = 1.56$, $P > 0.05$) showed that these subsamples of the follow-up sample did not differ significantly either.

Instruments and Procedure

Assessment of the Environment at 2 years. Mothers were interviewed about their children's environmental opportunities by means of a 31-item questionnaire. The questions referred to typical or representative patterns of the children's life ecology (cf. Barker & Wright, 1955; Bronfenbrenner, 1979), that is, to the range of settings the children spend time in, the activities they participate in, the toys and other age-appropriate, cognitively enriching objects they have available, the persons with whom they interact, and the restrictions placed on their exploration of the environment. In order to reduce the risk of obtaining socially desirable answers, the questions asked in the interview demanded a detailed description of concrete occurrences rather than generalisations.

The interviews were conducted in the mothers' homes and audio-taped. A few mothers asked not to be taped for religious reasons; their answers were recorded in writing. Five interviewers were used. All were graduate students, with former experience in interviewing. They were trained on a

pretest sample and received ongoing feed-back during the project on their interviewing technique.

The interviews were transcribed verbatim and the protocols scored on 36 dichotomous variables. Preliminary item analysis was carried out by the means of a factor analysis solved for a single factor. Eleven of the variables were removed because they shared less than 3% of their variance with the rest. The remaining 25 variables are presented in Table 2.

The behavioural items of the scale were scored positive if the pattern described by them represented what was typically happening in that particular home. For instance, item no. 7 was scored positive only if parents regularly and not just sporadically assisted the child in his or her toy play. The scoring of most items is self-explanatory, with one exception. Since the mothers were interviewed just before the children turned 2 years of age, the items regarding the type of care in the third year (nos 23, 24 and 25) were scored according to the arrangements mothers made for the coming year at the time of the interview. This information was double-checked when the mothers were next seen in the follow-up phase, though obviously not for the children who could not be located or whose mothers refused to participate. It should be mentioned that except for a very few cases, the children did actually receive the type of care mothers had planned for them at the time of the interview, which is to be expected given that the interviews were conducted between June and September, and registration to playgroups and day-care takes place several months earlier.

The protocols were coded by two coders who worked on different parts of the interview. The reliability of the coding system was checked by each coder's re-coding the other's part of the interview on 20 protocols selected at random. Percent intercoder agreement was 95.2%. The internal consistency of the scale, measured by Cronbach's Alpha, was 0.86.

Assessment of School Achievement. Three sets of measures of school achievement, independently obtained, were used in the study.

1. Information was obtained from the school or the school system as to whether the child was ever held back in grade or else assigned to special education classes. Normative class placement according to chronological age was taken as a severe criterion of minimally adequate functioning in school, an indication that the child had been fulfilling some minimal expectations of the school system as to cognitive skills and social behaviour. Measures similar to these have been used by Lazar, Hubbell, Murray, Rosche, and Royce (1977) and others as criteria of school achievement.

2. Two objective tests of school achievement measuring children's mastery of the second-grade curriculum were administered to the children in

their home at the end of the school year. The first was a 34-item test of reading comprehension developed by Ortar and Ben-Shakhar (1972) and routinely used in Israeli research (e.g. it was used to test 3377 second-graders by Klein and Eshel, 1980). The split-half reliability of the test is 0.87 (with the Spearman–Brown correction), the correlation with teacher's grades of reading comprehension is 0.73, and the correlation with the verbal IQ score of the MILTA group intelligence test is 0.68 (Ortar & Ben-Shakhar, 1972).

The second test was one of arithmetic, developed by Minkovitz et al. (1980). This test is also routinely used in Israeli research (e.g., except for Minkovitz et al., 1980, who tested 4426 second-graders, it was used also by Klein & Eshel, 1980 and others). The Cronbach Alpha reliability coefficient reported by them was 0.92. The correlation between the test scores and the verbal and non-verbal IQ scores obtained on the MILTA was 0.47 and 0.41, respectively, indicating that the test was heavily loaded on the verbal factor. In order to shorten the test somehow and decrease the verbal loading, eleven of the original items were not used in the reported study, five of these were items that in the pretest had been found to demand an unusually large amount of reading, and the rest some easy items that were duplicates of other items in the test. A final version of 34 items, similar in its overall difficulty to the full version, was administered to the sample. The score on each test is number of items correct out of a maximum of 34.

3. Teachers' evaluations of the children's school performance were obtained by a six-item questionnaire in which they rated the children's skill in reading comprehension and arithmetic, their overall academic achievement, the quality of their relationships with other pupils, the appropriateness of their behaviour towards the teacher, and their overall standing as pupils. Appendix A presents the rating instrument. In order to control to some extent for the variability in the quality of the different schools and classes, the ratings were relative to the performance of other children in the same class. Pearson correlation coefficients between teachers' ratings and the objective test results were $r(113) = 0.62$, $P < 0.001$ for reading comprehension and $r(114) = 0.69$, $P < 0.001$ for arithmetic. All the academic evaluations were also positively correlated with Normative Class Placement (0.49 to 0.60) as were evaluations of relations with classmates (0.46), but not evaluations of relations with the teacher (0.10). The different teacher evaluations were positively intercorrelated, with Teacher Relations and Classmate Relations having medium-sized correlations with the cognitive measures and with each other (0.23–0.55) and the cognitive evaluations very high intercorrelations among themselves (0.77–0.87). Similar patterns of correlations between academic achievement and school-related social competence have been found in an American study (Green, Forehand, Beck, & Vosk, 1980).

RESULTS

Assessment of the Environment at 2 Years

Table 2 presents the proportion of the sample scored positively on the 25 environmental measures.

In order to explore the factorial structure of the scale, a factor analysis was carried out on the 25 variables, using an orthogonal Varimax rotation and solved for six factors (Eigen value at least 1.15). These factors accounted for a total of 66.0% of the variance. The rotated factorial matrix is presented in Table 3. Only loadings above 0.30 are presented in the Table.

The factorial structure of the scale is relatively simple. The six factors are loaded on items concerned respectively with the availability of picture-books, toy play, freedom of exploration, the extent and nature of the

TABLE 2
Proportion of Sample Scored Positive on 25 Environmental Variables (n = 178)

Variables	*Proportion scored positive (%)*
1. Child has at least one book available	87.0
2. Child has more than one book available	79.1
3. Child has had books for more than 6 months	75.1
4. Child is being regularly read to by somebody older	79.7
5. Child is being regularly read to by parents	76.3
6. Child's home toy play is assisted by somebody older	78.0
7. Child's home toy play is assisted by parents	65.0
8. Child has jigsaw puzzles	19.2
9. Child has fine coordination toys (except blocks and Lego)	60.5
10. Child is taken on outings (e.g. swimming pool, zoo)	26.4
11. Child *not* confined to playpen or bed while awake	95.5
12. Child *not* forbidden to touch non-dangerous objects	79.8
13. Child *not* forbidden to enter certain rooms at home	96.1
14. Child permitted to feed self most or all dry foods	85.9
15. Child permitted to feed self most or all liquid foods	51.4
16. Child is in regular contact with other children	78.1
17. Typical contact is more than momentary	73.6
18. Contact is with children the child is acquainted with	86.0
19. Some contact is with age-mates	78.1
20. Child is in care outside the home in the 2nd year	36.5
21. Child has access to additional toys in care (2nd year)	36.7
22. Child is in care with at least one age-mate in 2nd year	26.4
23. Child is in care outside the home in the 3rd year	66.3
24. Child has access to additional toys in care (3rd year)	66.1
25. Child is in group care in the 3rd year	55.1

child's contact with other children, secondary care in the second year of life, and secondary care in the third year of life. Only five items are significantly loaded on more than a single factor. Out-of-the-home care in the third year is significantly loaded both on its specific factor and on the secondary care in the second year of life factor, since most children who were in such care in the third year had been in out-of-home care in the second year as well. Adult and parental supervision of toy play is significantly loaded on the Books factor, indicating a parental consistency in providing adult-supervised cognitive stimulation to the children. Taking the children on outings and not restricting them in playpens at home are loaded about equally on the Toys and the Freedom of exploration factors, suggesting that these items are influenced both by a general parental tendency not to restrict the children's freedom of exploration, as well as by a tendency to provide them with a varied range of activities.

TABLE 3
Factor Loadings of Environmental Variables

Variables	*Factors*					
	1	*2*	*3*	*4*	*5*	*6*
1. Child has at least one book	0.83					
2. Has more than one book	0.82					
3. Has had books for 6 months	0.84					
4. Child regularly read to	0.88					
5. Parents regularly read to child	0.87					
6. Home toy play assisted by somebody	0.38	0.70				
7. Home toy play assisted by parents	0.51	0.60				
8. Has jigsaw puzzles		0.32				
9. Has fine coordiantion toys		0.43				
10. Child is taken on outings		0.38	0.52			
11. Not confined to playpen awake		0.41	0.47			
12. Not forbidden to touch objects			0.52			
13. Not forbidden to enter rooms			0.63			
14. Permitted to feed self dry foods			0.68			
15. Permitted to feed self liquid foods			0.64			
16. Regular contact with children				0.93		
17. Extended contact with children				0.95		
18. Typical contact with acquaintances				0.78		
19. Some contact is with peers				0.85		
20. In care outside the home (2nd year)					0.85	
21. Additional toys in care (2nd year)					0.81	
22. In care with age-mate (2nd year)					0.67	
23. In care outside the home (3rd year)					0.84	0.36
24. Additional toys in care (3rd year)						0.92
25. Group care (3rd year)						0.92

On the basis of these results, six factorial scores were computed for each subject, called hereinafter Books, Toys, Exploration, Peers, Care in 2nd year, and Care in 3rd year. The scores were the weighted means of the standardised values of the variables, weighed by the factor-score coefficients. Since these scores were derived from an orthogonal rotation, they are independent and are not correlated with each other. A Total environmental score was also computed by totalling the six factorial scores.

Prediction of the Quality of the 2-years Environment by the Demographic Characteristics of the Family

Multiple regression analyses were carried out on the six environmental measures and on the Total Environmental Score, entering into the analysis as predictors the family's SES (reflecting mothers' and fathers' years of education and work status), ethnicity (western vs non-western countries of origin), parental birthplace (abroad vs in Israel), and number of children. Parental SES entered with a significant beta-value the regression equations for the Books, Toys, and Exploration factorial scores, as well as the Total Environmental Score, and number of children significantly contributed to the prediction of the Peer factor and the Total Environmental Score. The two out-of-the-home care measures were not significantly predicted by the demographic variables. Neither ethnicity nor parents' birthplace entered any of the equations.

Assessment of School Achievement

Table 4 presents the means and SDs of the 2nd-grade criteria, as well as the different scores' range, and the size of the sample on which information is available.

It appears that children did much better on the Reading Test than on the Arithmetic one. In the former, 91.1% of the children answered correctly 80% or more of the questions (which is considered success in these tests), whereas in the latter, only 35.7% did so. This finding replicates that of Minkovitch et al. (1980) concerning the much higher achievements in reading comprehension of second-grade pupils in Israeli elementary education.

The Prediction of 2nd-Grade Achievement by Background Variables

Multiple regression analyses were carried out on the nine 2nd-grade criteria, entering as predictors the family's SES, ethnicity, parents' birthplace, and number of children in the family. Prior two-way ANOVAS

TABLE 4
Scores, Means, and SDs of 2nd-grade Criteria

Criteria	*Score*	*n*	*Mean*	*SD*
Reading comprehension evaluation	1–5	127	4.08	1.06
Arithmetic evaluation	1–5	127	4.00	1.08
Overall achievement evaluation	1–6	127	4.17	1.44
Classmate relations evaluation	1–5	127	3.96	0.97
Teacher relations evaluation	1–5	127	4.29	0.74
Overall pupil evaluation	1–5	127	3.64	0.98
Normative class placement	1–2	149	1.92	0.27
Non-normative	1	12	(8.1%)	
Normative	2	137	(91.9%)	
Reading comprehension test	0–34	123	30.67	4.56
Arithmetic test	0–34	115	21.67	7.22

revealed that no significant interactions between pairs of background variables existed on either Reading Evaluation, Arithmetic Evaluation or Normative Class Placement. Consequently, no interaction term was included in the multiple regression analyses. In all but the Teacher Relations criterion, SES was a significant predictor. Number of children was a significant predictor of Reading Evaluation, Reading Test and Arithmetic Test. Neither ethnicity nor parents' birthplace reached significance in any of the equations, although all the first-order correlations between ethnicity and the criteria were significant (-0.23 to -0.46), and so were the correlations between birthplace and the two reading measures (0.15 and 0.23).

The Prediction of 2nd-Grade Criteria by 2-Year Environment

Multiple regression analyses were carried out on the nine 2nd-grade criteria, entering as predictors the six environmental scores. The beta-values of the predictor variables and the multiple regression coefficients (R) appear in Table 5.

All analyses but the Teacher relation one were significant at least at the $P < 0.05$ level. Checking for the unique contribution of the six environmental measures to the predictions, it appears that the Books, Toys, Peers, and Exploration measures significantly contributed to the prediction of all three kinds of school criteria, namely, evaluations, tests, and normative class placement. The Care in 3rd year score significantly contributed only to the prediction of school-based criteria, but not to the prediction of objective test results. The Care in 2nd year score had no unique contribution to any of the criteria.

TABLE 5
Unique Contributions of the Six Environmental Factors to the Prediction of School Performance (Beta Values) and Multiple Regression Coefficients (R)

	Environmental factors						
Criteria	*Books*	*Toys*	*Explor.*	*Peers*	*Care 2nd*	*Care 3rd*	*R*
Reading eval.[a]	0.52***	0.35***	0.21**	0.15*	0.09	0.34***	0.69***
Arithmetic eval.	0.33***	0.34***	0.22**	0.18*	0.05	0.30***	0.57***
Overall academic	0.47***	0.31***	0.21**	0.17*	0.13	0.32***	0.64***
Classmate relations	0.25**	0.17*	0.22*	0.18**	−0.02	0.17*	0.43***
Teacher relations.	0.18	0.00	0.07	0.14	0.03	−0.07	0.24
Overall Pupil Eval.	0.39***	0.28***	0.28***	0.17*	0.12	0.32***	0.61***
Class placement[b]	0.40***	0.23**	0.17*	−0.15*	−0.00	0.26***	0.54***
Reading test[c]	0.51***	0.19*	0.21**	0.14	0.04	−0.04	0.58***
Arithmetic test[d]	0.36***	0.36***	0.22**	0.26**	0.14	0.02	0.56***

[a]N = 126–127 for the six evaluations; [b]N = 149; [c]N = 122; [d]N = 115.
*$P < 0.05$. **$P < 0.01$. ***$P < 0.001$.

The Relationship of Demographic and Environmental Variations as Predictors of School Achievement

Path analysis was employed to test a causal model of the relationship of demographic and environmental variables as predictors of school achievement. According to this model, demographic variables have both a direct and an environmentally mediated effect on school achievement, and environmental variables have a further direct effect on achievement when the demographic variables are controlled. In the first test of this model, the effects of SES and number of children on the school criteria were estimated. The results are presented in Table 6. The estimates are derived from the solution of two multiple regression analyses, in the first of which only the two demographic variables were used as predictors, whereas in the second both the demographic variables and the environmental measures were used. As the criterion Teacher Relation was not predicted either by demographic or by environmental measures, it was excluded from the path analysis.

The results support the model. It appears that about 55% of the effect of SES and number of children on school achievement can be accounted for by the mediation of proximal environmental factors, replicating the majority of previous findings in the field. In all but the Normative Class Placement and the Classmate Relations criteria, the direct (i.e. unmediated) effect of the demographic variables was also significant.

In the second test, the effect of the environmental measures on the eight school criteria was decomposed into covariance shared with the demo-

TABLE 6
Decomposition of the Effects of the Demographic Variables on 2nd-grade Criteria to Direct and Environmentally Mediated Effects (Beta Values)

	Type of Effect		
Criteria	*Total*	*Direct*	*Environmentally mediated*
Reading evaluation[a]	0.64***	0.28***	0.36***
Arithmetic evaluation	0.56***	0.29***	0.27***
Overall academic eval.	0.61***	0.28***	0.33***
Classmate relations	0.40***	0.21*	0.19
Overall pupil eval.	0.55***	0.23**	0.32***
Class placement[b]	0.32***	0.07	0.25***
Reading test[c]	0.49***	0.22*	0.27***
Arithmetic test	0.62***	0.38***	0.24**

[a]N = 126–127 for the six evaluations; [b]N = 149; [c]N = 122–123 for the two tests.
*$P < 0.05$. **$P < 0.01$. ***$P < 0.001$.

TABLE 7
Decomposition of the Effects of the Environment Measures on 2nd-grade Criteria to Covariance Shared with the Demographic Variables and Direct Effects when the Demographic Variation is Controlled (Beta Values)

Criteria	*Type of Effect*		
	Total	*Direct*	*Covariation with Demographic Variables*
Reading evaluation[a]	0.69***	0.39***	0.30***
Arithmetic evaluation	0.57***	0.33**	0.24*
Overall academic eval.	0.64***	0.34***	0.30***
Classmate relations	0.43***	0.27*	0.16
Overall pupil eval.	0.61***	0.36***	0.25*
Class placement[b]	0.54***	0.44***	0.10
Reading test[c]	0.58***	0.39***	0.19
Arithmetic test	0.56***	0.27*	0.29**

[a]N = 126–127 for the six evaluations; [b]N = 149; [c]N = 122–123 for the two tests.
*$P < 0.05$. **$P < 0.01$. ***$P < 0.001$.

graphic variables and direct effects caused by environmental variation when demographic characteristics are controlled for. The results are presented in Table 7.

The results support the claim that the environmental measures have a significant direct effect on school achievement, after controlling for the demographic characteristics of the family. The size of this effect is as large or larger than the covariance shared by the environment and the demographic variables.

DISCUSSION

In a replication of findings from the United States, three sources of the variability in school achievement were identified in an Israeli sample. These are the direct and environmentally mediated effects of the families' demographic characteristics, namely SES and the family configuration, and individual differences in the quality of the early environment, among demographically homogeneous families. Although correlations between environmental and outcome measures taken at two different ages cannot be interpreted causally (cf. McCall, 1981), the results are consistent with a model according to which SES and family configuration influence child-rearing practices, and the latter in turn determine the course of children's cognitive and social development (cf. Bloom, 1964). As to the non-environmentally mediated effect of the demographic variables, it is at present unclear whether such results reflect some weakness of the various

environmental assessment instruments to capture all of the important facets of the rearing environment, or else reflect some other type of effect of these variables (such as a genetic factor; cf. Scarr & Weinberg, 1978).

According to our results, an important feature of a good rearing environment for 2-year-olds from the point of view of social–cognitive development is that it allows the free exploration of developmentally challenging objects, and in particular fine-coordination toys and picture-books, with adult support. This replicates previous findings in American samples (e.g. Beckwith & Cohen, 1984; Carew, 1980; Clarke-Stewart, 1973; Elardo, Bradley, & Caldwell, 1975; Gottfried & Gottfried, 1984; Wachs, 1978). Among the novel environmental measures tested in this study, the extent to which 2-year-olds were involved in social relations with peers appeared to have a positive contribution to their eventual social and cognitive performance in the second grade. The size of the effect was not large but it appeared independent of other features of the environment. This suggests that the social–cognitive facilitating role of peer interaction previously thought to exist for older children (Bearison, 1986) is already operative around the second birthday. The second group of variables, also to do among other things with the child's expanding social world, which tested positively, was extrafamilial care between the ages of 2 and 3 years. This set of variables, however, only predicted adequate fulfilment of school-imposed cognitive and social tasks, but not the scores on school-independent objective tests of reading comprehension and arithmetic ability. It appears that an extra year between these ages in some kind of preschool setting may help prepare a child to adjust to the institutional world of the school, and may teach the child some skills appropriate to the kind of learning expected in the school context, but that it probably does not confer true intellectual gains. As to the third set of variables tried out in this study, concerning extrafamilial care between 1 and 2 years of age, our results suggests that the extra diversity in the cognitive and social stimulation brought about by such care appears to neither facilitate nor damage children's eventual school achievements. Except for this last factor, the covariances found between the environmental variables and the school criteria provide a measure of construct validity to the environmental assessment instrument employed in this study.

Among the questions asked in this study and of central interest to the Israeli society was whether ethnicity (i.e. western vs non-western country of origin) has an effect on school achievement beyond that accounted for by the lower SES and larger number of siblings in non-western families. The results have shown that no such specific ethnic factor exists and that the significantly lower achievements of non-western children found in previous investigations (e.g. Minkovitz et al., 1980) as well as in this study do not reflect some ethnicity-specific cultural deficit of this population. The

marked similarity between the results of this study and previous findings obtained in the United States, appearing despite considerable sociocultural differences between the latter and Israeli society, also suggests that the source of social–cognitive underachievement in children are such cross-culturally basic categories as low income, low parental education, large sibling sizes, and an impoverished rearing environment.

An open question is: what are the reasons for the observed variability in the quality of the early environments provided in different families? The variation in the quality of the rearing environment with the family's SES and with the number of children in the family is usually attributed to differences in family resources (cf. Johnson et al., 1984). Undoubtedly the educational, occupational, and configurational characteristics of a family influence the resources available for allocation to a young child, whether in terms of income and time, or in terms of global psychological resources like ego strength. However, the possibility exists that some of the variability in the quality of the rearing environment is attributable to consistent differences in parents' notions of what are age-appropriate experiences for young children. It is by now a well-established research finding that there exist pronounced cross-cultural, class and individual differences in parents' implicit or "naive" theories of infant development. Western, middle-class, and highly educated parents believe that infants and young children acquire basic cognitive abilities like seeing, hearing, comprehending speech, expressing adult-like emotions, communicating their needs, and so forth at an earlier age than do non-western, low-SES, less-educated parents (Bee et al., 1982; Goodnow, Cashmore, Cotton, & Knight, 1984; Ninio, 1979; Rosenthal, 1985; Tulkin & Cohler, 1973). Interrelatedly, the same cultural and subcultural differences also appear in parents' instrumental beliefs regarding the age-appropriateness of various activities for young children. For instance, lower-class parents believe that the introduction of cognitively stimulating activities during the first years such as telling stories, and of manipulative freedoms such as feeding the self, should occur at a later age than specified by middle-class parents (Bronfenbrenner, 1958; Ninio, 1979). On a theoretical basis (e.g. Ajzen & Fishbein, 1980) it is reasonable to expect that such instrumental beliefs regarding young children's ability to benefit from various experiences at a given age actually guide parents' choices of the kind of environmental experiences they see fit to accord to their children. Individual differences in these beliefs might well be the source of some of the within-class variability in the quality of the early environments that was found in this study as well as in previous ones (e.g. Bradley & Caldwell, 1984). Such parental cognitions and their relation to parental behaviour appear to be a potentially fruitful subject for further exploration.

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APPENDIX A

Teacher's Evaluation Scales (translated from Hebrew)

1. Evaluate the pupil in comparison to the other pupils in the class. *Circle your answer.*

   The pupils achievements in reading comprehension are:

   Very good / good / average / weak / very weak

2. The pupil's achievements in arithmetic are:
   Very good / good / average / weak / very weak
3. Give a general evaluation of the pupil's scholarly achievements.
   Mark the sentence best describing the pupil by X.
   The pupil is among the 5 most excellent in the class.
   The pupil is among the 10 best pupils in the class.
   The pupil is in the better half of the class.
   The pupil is in the weaker half of the class.
   The pupil is among the 10 weakest pupils in the class.
   The pupil is among the 5 weakest pupils in the class.
4. Evaluate how well the pupil gets along with the other pupils in the class.
   Circle your answer.
   Very well / well / usually reasonably well / not well / not at all
5. Evaluate the behaviour of the pupil towards you:
   Very appropriate / appropriate / usually reasonable / inappropriate / extremely inappropriate
6. In summary, evaluate how well does the pupil fulfil the demands of school in general:
   Model pupil / good pupil / average pupil / problematic pupil / very problematic pupil