

## Depressive Symptoms in Young Adults: The Influences of the Early Home Environment and Early Educational Child Care

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The relationship between depressive symptoms in young adults, the quality of the early home environment, and early educational child care was investigated in young adults randomly assigned to receive early childhood intervention in the Abecedarian study. Of the original 111 infants enrolled (98% African American), 104 participated in an age-21 follow-up. Those who had early treatment reported fewer depressive symptoms. The protective effects of the early childhood program were further supported by a significant home environment by treatment interaction. Negative effects of lower quality home environments on young adult depressive symptoms were almost entirely offset by preschool treatment, whereas depressive symptoms increased as the quality of the early home environment decreased for those in the control group.

Depression is one of the most pervasive mental health problems affecting individuals of all ages. Research indicates that 10–15% of children and adolescents experience symptoms of depression (Report of the Surgeon General, 2001), and the prevalence of depression has been noted to increase significantly from adolescence into early adulthood (Pine, Cohen, Gurley, Brook, & Ma, 1998; Pine, Cohen, Cohen, & Brook, 1999). Approximately 9.5% of American adults suffer from a depressive disorder annually (National Institute of Mental Health, 2001). Beyond those who meet diagnostic criteria for major depression, an estimated 11% of individuals experience depressive symptoms that significantly impair life functioning (Depression Guideline Panel, 1993). Furthermore, females experience higher rates of de-

pression than males, both annually and over the lifetime; women may experience depressive symptoms at rates twice that of men (Depression Guideline Panel, 1993; Kessler, 2003; Maier et al., 1999; National Institute of Mental Health, 2001). Additionally, individuals in poverty experience elevated rates of psychiatric disorders, including depression (Costello, Compton, Keeler, & Angold, 2003). Among the consequences of depression are employment difficulties and loss of income (Wooley et al., 2002), thus increasing the negative impact of depression on those in poverty. The large number of individuals affected by depression and its associated impairments underscores the importance of examining interventions that may reduce the incidence of depression, particularly for those in economically disadvantaged environments.

Low socioeconomic status (SES) in early childhood (i.e., birth to age 7) has been shown to be associated with an increased risk for depression in adulthood (Gilman, Kawachi, Fitzmaurice, & Buka, 2003). The negative effect of childhood poverty may be due, in part, to its impact on the home environment. Bradley, Corwyn, Burchinal, McAdoo, and Coll (2001) used data from the National Longitudinal Survey of Youth to look at effects of ethnicity and SES on the quality of the home environment and found that “being poor affects nearly every aspect of children’s home lives . . . from parental responsiveness to parental teaching, from the quality of the physical environment to the level of stimulation for learning present and from the likelihood of having significant contact with one’s father” (p. 1863). A number of

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studies have indicated that the effect of poverty on children's mental health is mediated through their caregivers' psychological functioning (Conger et al., 1992, 2002; McLoyd, 1990, 1998; McLoyd, Jayaratne, Ceballo, & Borquez, 1994; Sameroff & Seifer, 1995). Negative financial events, work instability, and low family income are associated with economic pressure, which in turn is related to depressed moods in parents or caregivers (Conger et al., 1992; McLoyd et al., 1994). The heightened psychological distress that poor parents experience may disrupt or embitter marital relationships, and decrease parental warmth and nurturance, thereby adversely affecting children's psychosocial development (Conger et al., 2002; McLoyd, 1990, 1998).

Research concerning the link between distal factors associated with environmental disadvantage and adolescents' internalizing difficulties has shown these effects to be mediated by proximal processes. For example, Felner et al. (1995) examined the link between parental education and employment level, and measures of proximal experiences at home and school (family climate, parental acceptance, school climate, social support, and stressors) and indexes of adolescent psychological adjustment and school performance. In every instance except for classroom behavior, adding proximal processes to prediction models weakened the effect of more distal parental circumstances on adolescent outcomes. Conger, Conger, Matthews, and Elder (1999) elucidated the relationship between family economic struggles and adolescent distress by showing the latter to be related not only to the economic deprivations themselves, but to the adolescent's awareness of family hardship that reduced his or her sense of mastery and control, leading to heightened distress.

The effects of poverty on families and, in turn, on children's mental health are consistent with Bronfenbrenner's (1986) ecological model of development. Poverty affects variables that are both proximal (e.g., parental behavior) and distal (e.g., employment pressures on the parent) to the child. Furthermore, while "the family is the principal context in which human development takes place, it is but one of several settings in which developmental processes can and do occur" (Bronfenbrenner, 1986, p. 723). Thus, other environments in which children spend a considerable amount of time may also have a significant impact on their mental health. The processes operating within different settings are not independent; thus, events at home are likely to influence adjustment in other settings, or vice versa (Bronfenbrenner, 1986). The ecological theory suggests that a particularly positive early environment,

such as that provided through high-quality, nurturant child care, may moderate the effects of a poor home environment.

Research supports the association between experiences in child-care settings and socioemotional outcomes in children. The structure and quality of child care have been noted to influence adult-child interactions and children's outcomes. Low child-caregiver ratios allow caregivers to spend less time managing disruptive behavior; caregivers within such settings have been found to be more supportive, warm, socially stimulating, and responsive toward children (see review by Vandell, 2004). Furthermore, responsive and supportive child-care environments with lower adult-child ratios may positively influence children's socioemotional adjustment, as evidenced by greater prosocial and positive interactions with peers. Longitudinal research examining the effects of early educational intervention programs offered in child care or preschool settings affords an opportunity to examine the mental health benefits of high-quality child-care programs, and test whether such settings moderate the impact of less optimal home environments.

A number of early intervention programs have been developed to enhance the cognitive development and academic outcomes of children growing up under impoverished circumstances and have found positive effects in both domains (e.g., Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Lally, Mangione, & Honig, 1988; Reynolds, 1994; Schweinhart & Weikart, 1997). Less is known, however, about the long-term effects of such programs on mental health. Four exceptions to this generalization are the Chicago Child Parent Center program, the Syracuse University Family Development Research program, the Perry Preschool study conducted in Michigan, and the Abecedarian Project in North Carolina. All provided early educational interventions to a low-income population either through a preschool or child-care model, and all have collected some form of early childhood data regarding children's socioemotional adjustment. Both the Abecedarian and Syracuse University studies followed a child-care model, serving participants from infancy to school age, while the Chicago and Perry Preschool programs followed a traditional preschool model that served 3- and 4-year-olds. The Abecedarian and Chicago studies also included the possibility of a school-age component for children in the primary grades. The services provided to parents and the degree of familial involvement varied among programs. Parents received home visits in the Perry Preschool program; the Syracuse

University program provided family education to mothers in the treated group; and families in the Abecedarian treatment program received free pediatric primary care for their treated child, and both treated and control children in this study received emergency social service assistance (Campbell, Ramey, Pungello, Miller-Johnson, & Sparling, 2002; Lally et al., 1988; Reynolds, Chang, & Temple, 1997; Schweinhart, Barnes, & Weikart, 1993).

In contrast to the consistent findings concerning the benefits of early educational intervention on cognitive development and academic outcomes, results related to indexes of early or middle childhood socioemotional adjustment vary among the four programs. In some instances, early educational intervention was associated with positive effects on children's social and emotional functioning in the early childhood and/or early school years, such as higher social emotional functioning at 36 months of age, better emotional adjustment, social adjustment, and classroom behavior in the elementary years (Lally et al., 1988; Reynolds, 1994; Weikart, Bond, & McNeil, 1978). On the other hand, negative effects have also been found. The Abecedarian study reported that treated children outscored children in the control group in terms of bossiness, verbal aggression, physical aggression toward adults, and defiance (Haskins, 1985); the Syracuse program found similar tendencies in treated children (Lally et al., 1988). Even within studies, findings about primary school adjustment have been inconsistent. The negative Abecedarian finding of greater physical and verbal aggression in treated compared with control children (Haskins, 1985) was not replicated in later cohorts (Burchinal & Bryant, 1991). Similarly, there were no treatment/control differences in emotional adjustment as rated by kindergarten teachers of children from the Perry Preschool program, but in grades one and two, teachers rated treated children as better adjusted (Weikart et al., 1978).

More long-term effects of early intervention on social adjustment primarily involved indexes of delinquency and crime. Findings are also inconsistent across studies for this outcome. The Syracuse, Chicago, and Perry Preschool programs all reported reductions in delinquency and criminal behavior (Lally et al., 1988; Reynolds et al., 1997; Schweinhart et al., 1993). In contrast, no significant differences in the number of charges filed against late adolescents were found for treated and control groups in the Abecedarian study (Clarke & Campbell, 1998), nor were there significant treatment/control differences in self-reported criminal convictions and sentences among its young adults (Campbell et al., 2002).

While the effects of these programs on externalizing difficulties such as physical aggression in early childhood, and criminal behavior in adolescence and young adulthood are inconsistent, even less is known about the effects that educational preschool programs may have on internalizing difficulties in young adults, such as depression. To date, only the Chicago program has reported relatively long-term social adjustment and mental health outcomes for its treated and comparison samples. Investigators of that study examined early family risk indexes and early intervention as predictors of school dropout, late adolescent delinquency, and depression (Smokowski, Mann, Reynolds, & Fraser, 2004). These investigators used a three-item "yes/no" measure of depression collected when participants were 16 years old; one or more "yes" answers provided their measure of depression. Early intervention was found to reduce the incidence of depression; however, more research is needed on the long-term effects of early child-care intervention programs on later internalizing problems. In particular, it would be valuable to have data derived from a more comprehensive measure of depression.

In sum, research has demonstrated a relationship between poverty and risk of mental health problems. Similarly, research has documented a link between poverty and the home environment on indexes of mental health. Some early intervention programs designed to enhance the cognitive development and academic performance of poor children also found positive effects on socioemotional adjustment, delinquency, and crime in childhood, adolescence, and adulthood. However, the extent to which early childhood educational interventions might protect children in low-income families from later mental health problems, particularly depression, is a concern deserving further examination.

The young adult follow-up study of the Abecedarian Program provides an opportunity to test the protective effects of a positive early child-care experience on later depressive symptoms. The Abecedarian study randomly assigned high-risk children to an early educational child-care program in which they received full-time center-based child care and educational services from infancy to age 5. The program emphasized cognitive, linguistic, and socioemotional development, while the control group represented the natural ecology for low-income families at the time. Family circumstances dictated the care that children in the control group received, and thus some children were in local child-care settings while others were cared for at home until kindergarten entry. Participants from both the

treated and control groups were periodically followed up through early and late adolescence and young adulthood. A mental health-screening instrument administered when participants were 21 years of age allows for an examination of the effects of an early educational intervention on the mental health of young adults.

The hypotheses tested in the current analyses were as follows: (1) the young adults who experienced the early child-care educational treatment will experience fewer depressive symptoms than will young adults who were in the untreated control group; (2) the quality of the early home environment of children reared in poverty will be negatively related to symptoms of depression in young adulthood; and (3) early educational intervention will moderate the effects of the early home environment on depression in young adulthood such that the effects of the quality of the home environment will be reduced for children who participated in the pre-school program.

## Method

### *Participants*

Study participants were young adults whose parents had enrolled them as infants in the Abecedarian study. The full sample consisted of 111 infants (53% female), born to 109 families, 98% of whom were African American. All families had to qualify on the basis of a High-Risk Index (Ramey & Smith, 1977) based on sociodemographic characteristics such as maternal and paternal educational levels, family income, father's presence in the home, evidence of school failure in parents or siblings, or other indicators of poor family adjustment requiring family assistance. These characteristics were weighted and summed to arrive at a high-risk score. In addition, the sample was limited to infants who appeared to be healthy newborns free of conditions associated with developmental delays or mental retardation, and they had to live within commuting distance of the child-care facility where the early childhood educational program was offered. Fifty-seven of the infants were randomly assigned to the treated group. Treatment was an intensive child-based program delivered in a full-time child-care setting from infancy until kindergarten entry.

Although family circumstances resulted in some children not having the full amount of treatment offered, all participants ever assigned to the treatment or control group were invited to take part in the long-term follow-up of the sample. Permanent at-

trition included four children who died before age 5, one who proved not to qualify because of a biological condition (seizure disorder associated with idiopathic moderate mental retardation), and one who was withdrawn. Thus, at the time of the young adult follow-up, 105 of the original participants were living and eligible for inclusion. All eligible participants were located, and 104 agreed to participate in the assessments.

### *Procedure*

Young adults were first contacted by a letter inviting them to take part in the follow-up. Subsequent telephone calls were made to answer questions and set up appointments. Data collection included a number of standardized measures and self-report questionnaires. Among the self-report questionnaires was a mental health-screening instrument that provided data for the present analyses. Data were typically collected in one session at the University. Travel expenses were paid for participants who lived beyond easy commuting distance of the research facility. All were reimbursed \$100 to cover time lost from work and other inconveniences associated with giving their time to the research. The study protocol was approved after Full Board review by the University's Academic Affairs IRB.

### *Measures*

*Depressive symptoms.* Depression was assessed using the Brief Symptom Inventory (BSI; Derogatis, 1993). The Inventory is a 53-item version of the Symptom Checklist 90 (Derogatis, 1975), a multidimensional self-report questionnaire designed to screen for psychopathology. The norms are based on adult outpatients, inpatients, and nonpatients. Those for adult nonpatients are based on 974 individuals, approximately half of whom were males (50.7%). The racial distribution was 11% Black, 86% White, and 3% "other." Social class data were not provided for the nonpatients. The Inventory yields three summary scores: a Global Severity Index, a Positive Symptom Total, and a Positive Symptom Distress Index. The authors of this instrument hypothesized nine primary dimensions: Depression, Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism (Derogatis, 1993).

Given that the literature indicates that depressive symptoms are especially prevalent among individuals living in poverty, the depression scale was selected for analyses in this study. The depression scale

consists of six items. Respondents rated the degree to which each problem (e.g., "Feeling blue," "Feeling no interest in things") applied to themselves within the past 7 days, on a scale ranging from 0 (*not at all*) to 4 (*extremely*). The scale has shown an internal consistency reliability ( $\alpha$ ) level of .85 and a test-retest coefficient of .84. Within the current sample, Chronbach's  $\alpha$  for standardized depression scores = .82, indicating that the scale is suitable for use with this group. Factor analytic studies have confirmed its unique character, and it correlates positively with the depression scale of the Minnesota Multiphasic Personality Inventory (Derogatis, 1993). Raw scores on this scale can be converted into gender-adjusted *T* scores that have a mean of 50 and a standard deviation of 10. These *T* scores were used in the present analyses. A *T* score of 63 or higher defines the clinical cut point for identifying depression.

*Early home environment.* Home visits were conducted during the preschool years when children were approximately 6, 18, 30, 42, and 54 months of age. On each occasion, the age-appropriate version of the Home Observation for Measurement of the Environment (HOME) was completed. This instrument is scored from observations of the parent and child at home and responses to questions about family routines and circumstances. Versions suitable for infants/toddlers (Caldwell & Bradley, 1979) and older preschoolers (Caldwell, undated) cover factors such as the affective quality of the parent (mother)/child interaction, the kinds of toys and educational materials provided, the parent's support for the child's learning, the stability of the family's routines, and the variety and breadth of stimulation available to the child. Previous analyses of these data indicated that, within our sample, the subscale scores were highly intercorrelated; thus, total HOME scores were analyzed. Furthermore, earlier analyses demonstrated that the total scores were highly correlated over time; therefore, for this study all HOME scores were summed across time to create a general measure of the cognitive and affective support for the child's development in the early childhood home. Caldwell and Bradley (1979) reported an internal consistency reliability of .89 for the infant-toddler version of the HOME and .93 for the preschool version (Bradley, Caldwell, Rock, Hamrick, & Harris, 1988). Bradley (1992) found comparable factor structures and predictive validity for the HOME among European American and African American samples. Locally,  $\alpha$  levels for the HOME ranged from .75 at 6 months to .89 at 54 months, with an overall average  $\alpha$  of .82.

### Data Analysis

A series of analyses were conducted to examine the effects of the early child-care intervention and the early home environment on young adult depression and whether the early educational intervention moderated the home environment effects. First, whether or not these factors predicted clinical levels of depression was examined by dichotomizing the sample into "cases" and "noncases" based on the BSI-recommended clinical cutoff score of  $T = 63$  or higher, and then conducting a series of logistic regressions with the home environment, preschool intervention group, and their interaction as predictors. Second, given that the study sample was largely free of diagnostic levels of mental illness, another set of analyses was conducted to test whether these selected predictors had any impact on the variability across all levels of symptoms. All cases were included in these analyses regardless of whether or not participants met the clinical cutoff score. The scores used in these models were *T* scores adjusted for gender. A series of multiple regressions was estimated with the home environment, preschool group, and their interaction as predictors. Multiple imputation procedures as recommended by Shafer and Graham (2002) were used to address the effect of data missing due to attrition as well as a few cases where *T* scores could not be computed because raw scores were out of range. This procedure improves the reliability of estimates and avoids the biases introduced by deleting incomplete cases or using more arbitrary substitutions for missing values.

Twenty imputations were produced using PROC MI in SAS version 8.2 (SAS Institute, 2002a). Of the 104 participants included in the analyses, 91 had complete data, 10 were missing HOME scores, and 3 were missing BSI depression *T* scores. Data were imputed with random variation for these 13 cases 20 times and the regressions were estimated 20 times. PROC MI-ANALYZE (SAS Institute, 2002b) was used to summarize parameter estimates across the 20 regressions and calculate appropriate standard errors of the estimates. No appropriate statistical test for the *F* statistic summarized across regressions estimated across multiple imputations has been developed; hence, none is reported.  $R^2$  was calculated as the mean across the 20 regressions for each model and an *F* statistic for the change in  $R^2$  was computed for the simple difference.

### Results

The means and standard deviations for the *T* scores on depression by preschool group and gender are

Table 1  
Means and Standard Deviations (SD) for Young Adult Brief Symptom Intervention (BSI) Depression T Scores by Treatment Group and Gender

Group	Mean	SD	% depressed
Control			
Female	59.64	10.01	39
Male	57.39	12.69	35
Total group	57.71	10.48	37
Treatment			
Female	53.56	10.34	24
Male	54.57	12.85	29
Total group	53.04	10.52	26

given in Table 1. Individuals who had child-care treatment endorsed fewer depressive symptoms on average than those in the control group. It is also noteworthy that the females in the control group had higher average *T* scores than any other group and that the difference between females in the treated group and the control group is larger than the difference between males in the treated and control groups. Preliminary models tested a main effect for gender and a gender by treatment interaction. Neither the main effect nor the interaction was significant, and the results presented here are without gender for simplicity.

Figure 1 depicts the distribution of depression *T* scores as a function of preschool treatment group. Inspection of Figure 1 shows that young adults from the treated group ascribed fewer depressive symptoms to themselves than did young adults in the control group. Across all groups, the mean depression scores were below the clinical cut-off score of *T* = 63. However, slightly more than a third (37%) of the individuals in the control group did rate themselves at that level or higher as young adults, in contrast to approximately a fourth (26%) of those who had the educational child-care experience.

In a preliminary step, HOME scores were examined in relation to intervention group and depression scores. The mean standardized HOME scores were similar for those assigned to the control and intervention groups,  $M = .66$ ,  $SD = .09$  and  $M = .67$ ,  $SD = .10$ , respectively,  $F(1, 102) = .21$ ,  $p = .650$ . This virtual identity of HOME means in the two groups rules out the likelihood that treatment effects could have been mediated by the early home environment because it shows that the first requirement for a mediation effect, that *intervention* be related to the proposed mediator (Baron & Kenny, 1986), was not met. First-order correlations between early childhood HOME scores and Depressive symptom *T*

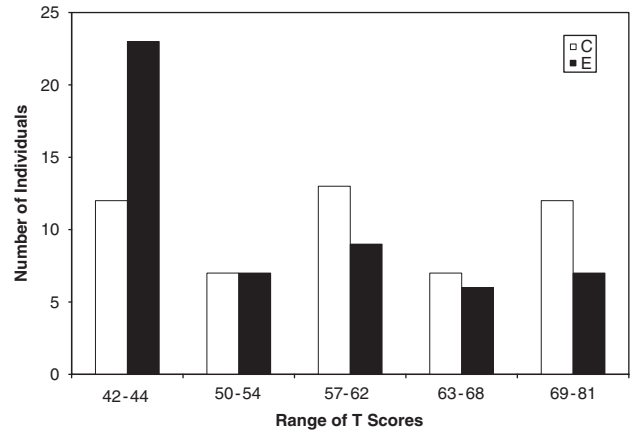


Figure 1. Brief Symptom Inventory depression *T* scores of Abecedarian young adults by preschool treatment status.

scores, calculated separately for the preschool treatment and control groups, were moderate and significant for the control group ( $r = .32$ ,  $p = .03$ ) but small and not significant for the child-care treatment group ( $r = .14$ ,  $p = .35$ ).

Three logistic regressions were estimated in sequence to examine the impact of intervention and home environment on the probability of meeting the diagnostic cutoff for depression on the BSI. First, a model with only the main effect for intervention group was estimated. Second, the main effect for home environment was added. In the third model, the interaction between intervention and home environment was added. When predicting to this dichotomous outcome, no statistically significant differences were found for the home environment, treatment group, or the interaction of home environment and group.

Next, three multiple regressions were estimated in sequence to examine the impact of intervention and home environment on the full range of *T* scores. Results for these regressions and the post hoc tests are presented in Table 2. First, the univariate effect of the intervention was tested and found to be significant ( $b = -4.41$ ,  $t = -2.12$ ,  $p = .03$ ), indicating that early intervention reduced BSI depression *T* scores by over 4 points on average. Second, the effect of the home environment score was added to determine whether intervention effects persisted when controlling for individual differences in the quality of the home environment. The results indicated the intervention effects were significant ( $b = -4.26$ ,  $t = -2.04$ ,  $p = .04$ ) and no main effect of the home environment score was supported ( $b = -9.98$ ,  $t = -0.87$ ,  $p = .38$ ). The change in  $R^2$  between Model 1 and Model 2 is not significant ( $\Delta R^2 = .78$ ,  $p = .38$ ).

Table 2  
Unstandardized  $B$  (and  $p$ -values) From Multiple Regressions Predicting Depression T Scores From Early Treatment and the Early Home Environment

Source	Model 1		Model 2		Model 3	
	$b$	$p$	$b$	$p$	$b$	$p$
Intercept	57.62	.00	57.66	.00	57.78	.00
Treatment	-4.41	.03	-4.26	.04	-4.79	.02
HOME			-9.98	.38	-34.61	.03
Treatment $\times$ HOME					45.87	.04
$R^2$	.046		.053		.093	
Post hoc						
Control group						
Intercept	57.78	.00				
Home	-34.61	.03				
Treatment group						
Intercept	52.98	.00				
Home	11.26	.48				

Note. HOME = Home Observation for Measurement of the Environment.

Post hoc regressions estimated separately by intervention group.

In the last step the interaction between home environment scores and intervention group was added. The results indicate a significant interaction ( $b = 45.87$ ,  $t = 2.01$ ,  $p = .04$ ). The addition of the interaction produced an increase in the average  $R^2$  of 4% ( $p = .04$ ), doubling the percentage of variance explained by the intervention alone. Post hoc regressions estimated separately for the control and intervention groups indicate a significant negative effect of home environment quality for the control group ( $b = -34.61$ ,  $t = -2.17$ ,  $p = .03$ ) and no such effect in the intervention group ( $b = 11.26$ ,  $t = 0.70$ ,  $p = .48$ ). These results support the hypothesis that the high-quality early intervention reduced depressive symptoms. The intervention does not appear to have improved home environments. Rather it buffered, or protected, the treated child from the adverse effects of a poor home environment.

### Discussion

The first hypothesis tested in this study was confirmed. When the full range of scores was examined, rather than treating depressive symptoms as reaching a clinical cutoff score, early educational child care was associated with endorsement of fewer depressive items. The second hypothesis, that the early home environment would also show a main effect on this outcome such that, across groups, higher endorsement of depressive scores was associated with

poorer quality home environments, was not confirmed. The third hypothesis was confirmed. The early child-care treatment did moderate the effect of the home environment. The significant treatment by home environment interaction showed that being in an intellectually stimulating and stable child-care program buffered the treated individuals against the effects of the home environment. In fact, it appeared to offset the relationship between the early home environment and subsequent feelings of depression almost entirely among the treated group. In contrast, within the control group, the more negative the early home environment, the more likely individuals were to endorse items describing a depressed mood when they were young adults.

Children in the early childhood educational treatment group experienced 5 years of full-time child care. Thus, the majority of individuals randomly assigned to the treatment group had a very stable and predictable early child-care environment. They were in the Center for 5 full days a week, year round. Little turnover occurred among the child-care center staff, such that familiar persons were encountered on a daily basis across these years. In contrast, children in the control group experienced a variety of child-care settings with less consistency of placement during their infancy and preschool years. The extent to which this relative stability in out-of-home care may have contributed to the buffering against depressed mood in treated individuals in later years is unknown, but theoretically, it should have served as an important proximal level of influence on their development. Within the educational child-care program, the focus was on the enhancement of cognitive and academic functioning, not specifically on mental health, but caregivers also sought to enhance interpersonal and communication skills. Having a stable and nurturing early environment might have led to more positive socioemotional development.

The study sample consisted almost entirely of African American children born into low-income families who had qualified as being at risk for having a child evincing poor cognitive and academic outcomes. The findings therefore generalize most directly to minority individuals growing up in families lacking many of the material resources available to those in better circumstances. While the study sample was primarily African American, the present findings are likely to generalize to other racial and ethnic groups; existing research suggests that differences in the home environment associated with race or ethnicity may be much less pronounced than those related to poverty (Bradley et al., 2001). The

early home environments of these young adults may have presented challenges, both in terms of economic resources and in terms of the affective atmosphere of the home that would have influenced the development of socioemotional well-being. Increased SES appears to grant parents access to a greater variety of tangible resources, as well as increase the quality and availability of emotional resources that enhance the home environment and in turn promote healthy social emotional development (Garrett, Ferron, Ng'Andu, Bryant, & Harbin, 1994).

The wealth of prospective data on the study sample provided an important opportunity to examine how early childhood intervention might offset early home circumstances to affect later psychological functioning. Extensive early childhood data including repeated assessments of the early home environment allowed for concurrent objectified assessments of its characteristics and conditions, increasing confidence in the measurement and understanding of the developmental support provided by the child's early home circumstances. Adding to the strengths present in the study's randomized prospective design is a low rate of attrition, and the fact that longitudinal data include early childhood as well as young adult data. Thus, the strengths present in the current design and analyses increase confidence in the findings.

Caveats of this study include the fact that the study sample was small, which created limitations in statistical power, and precluded the testing of more elaborate longitudinal models including other predictors that probably contributed to the levels of self-reported depressive symptoms in young adulthood. However, the analysis strategy used here maximized the information that could be derived from the data through the use of imputation techniques to compensate for missing data. This technique increases confidence in a conclusion that high-quality child care for poor children helps offset the risk of later depression, a known risk of growing up in poverty. The findings from this study are also consistent with the report by Smokowski et al. (2004), indicating that early intervention reduced depression in inner city youth.

The prevalence of psychiatric disorders in the U.S. population, especially among the poor, is a significant concern deserving greater attention. Overall, approximately 21% of U.S. children ages 9–17 experience at least minimum impairment due to a diagnosable psychiatric disorder, while 11% have psychiatric disorders that are characterized by significant functional impairments (Report of the

Surgeon General, 2001). A considerable body of literature illustrates that individuals living in poverty are more likely to suffer from mental health problems than individuals who do not live in poverty (e.g., Costello et al., 2003; McLoyd, 1990, 1998; Sameroff & Seifer, 1995). A recent survey published by the Centers for Disease Control (2004) reported that "poor persons were four times as likely as nonpoor persons to report serious psychological distress" (Centers for Disease Control, 2004, p. 5). Buckner and Bassuk (1997) found that diagnosable psychiatric disorders and their associated impairments affected approximately 32% of children living in poverty.

Although none of the study participants reported being under treatment for depression as young adults, as noted above, 26% of those assigned to the early childhood treatment group and 37% in the control group met the BSI screening criteria for depression. When interviewed as part of the young adult follow-up, a few described experiencing serious despair at an earlier point in their lives, including contemplation of suicide. Among those who did not meet the screening criteria for clinical depression, endorsement of any of the BSI depression items indicates psychological distress in that they measure loneliness, sadness, apathy, hopelessness, worthlessness, and suicidal ideation. Such psychological states are significant not only because they would impair one's ability to cope with daily challenges but also because such symptoms may be indicative of future mental health problems. As demonstrated in a longitudinal study of "subthreshold" depressive symptoms in adolescents and adults, higher levels of symptomatology were associated with greater psychological impairment, including increased substance abuse and increased instances of major depression (Lewinsohn, Solomon, Seeley, & Zeiss, 2000). Thus, depression might be considered a continuum, as Lewinsohn et al. (2000) suggest, and even so-called subclinical levels of depression may be clinically significant. The findings from the present study further support the importance of considering depression as a continuum, given that the long-term effects of early childhood experiences on later depressive feelings only became apparent when the young adult responses were examined across the full range of scores. All persons encounter difficulties as they mature, and developmental challenges such as those that accompany the transition to adulthood may increase vulnerability to depression (Rao, Hammen, & Daley, 1999). In the case of the young adults in this sample, these difficulties were exacerbated by the strains of poverty.



Poverty is associated with numerous variables that increase one's vulnerability to poor developmental outcomes (see review by Evans, 2004). Risk factors exert a cumulative influence upon socio-emotional development, such that the greater the number of risk factors in an individual's life the more vulnerable one is to poor mental health outcomes (Sameroff & Seifer, 1995). Furthermore, environmental risk factors may remain relatively stable throughout child development, adversely effecting development (Sameroff & Seifer, 1995). However, given that the Abecedarian study was a true experiment with random assignment of children to the preschool treatment and control groups, these circumstances and risk variables should have been randomly distributed across both the treated and control groups.

The present findings, in addition to prior studies documenting the impact that environmental risk has on child development, affirm the importance of intervening early in a child's life to reduce the adverse effects of early environmental risk on developmental outcomes in many domains. The interaction found here between consistent and cognitively engaging early child care and the quality of the early home environment illustrates one way that environmental risk may be reduced. Adding to evidence that positive gains can be made in academic progress is the present evidence that depressive symptoms can be alleviated to some extent. The high incidence of mental health problems among impoverished youth deserves greater attention; in addition, the disparity between the percentage of children and adolescents experiencing some level of psychosocial impairment and the number who receive mental health services is a matter of grave concern (Report of the Surgeon General, 2001). Evidence indicating that good early childhood experiences can make a positive difference in the mental health of individuals born into poverty underscores the importance of investing in high-quality early childhood experiences for poor children.

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