

Supporting Online Material for
School-Based Early Childhood Education and Age-28 Well-Being: Effects by
Timing, Dosage, and Subgroups

Arthur J. Reynolds,* Judy A. Temple, Suh-Ruu Ou, Irma A. Arteaga, Barry A. B. White

*To whom correspondence should be addressed. E-mail: ajr@umn.edu

This PDF file includes:

Materials and Methods
Supporting Text
References
Tables S1 to S14
Figs. S1 to S6

Contents

	Page
1. Materials and Methods.....	4
1.1. Study Background.....	4
1.2. Design and Study Sample.....	4
1.3. Validity of CPC and Comparison Group Contrasts.....	5
1.4. Adult Follow-up Sample and Group Comparability.....	6
1.5. Child-Parent Center (CPC) Education Program.....	6
1.6. Outcome Measures.....	8
1.7. Covariates.....	10
1.8. Analytic Strategy.....	10
1.9. Background on Propensity Score Procedures.....	12
2. Supporting Text.....	15
2.1. Research Background.....	15
2.2. Unadjusted Group Means and Differences.....	16
2.3. Additional Findings on Main Effects.....	16
2.4. Differences by Subgroup Characteristics.....	18
2.5. Robustness by Model Specification.....	19
2.6. Mediators of Effects on Well-Being.....	19
2.7. Findings in Context.....	20
3. References.....	23
4. Supplementary Tables.....	28
5. Supplementary Figures.....	61

Supplementary Tables

- S1a Patterns of Participation of Original Intervention and Comparison Groups in the CLS
- S1b Patterns of Participation of School-Age and Extended Intervention Groups in the CLS
- S2a Equivalence of CPC Preschool Intervention and Comparison Groups on Preprogram Attributes for the Age 28 Follow-up Study
- S2b Equivalence of CPC School-age Intervention and Comparison Groups on Preprogram Attributes for the Age 28 Follow-up Study
- S2c Equivalence of CPC Extended Intervention and Comparison Groups on Preprogram Attributes for the Age 28 Follow-up Study
- S3 Data Sources of Adult Outcomes by Age 28
- S4 Chicago Longitudinal Study Occupational Prestige Scale
- S5 Descriptive Statistics for Study Measures
- S6a Estimates of Sample Recovery for Three Outcomes
- S6b Estimates of Participation in the CPC Program
- S6c Propensity Scores: Means and Standard Errors of the Mean
- S6d Probability of Program Participation and Recovery by Program and Comparison Group Status
- S6e Robustness Analysis for Predicting CPC Preschool Participation by Model Specification
- S6f Robustness Analysis for Predicting CPC School-Age Participation by Model Specification
- S6g Robustness Analysis for Predicting CPC Extended Intervention Participation by Model Specification (Extended-1 Contrast)
- S7a Robustness Results for Selected Outcomes
- S7b Additional Robustness Results for Selected Adult Outcomes
- S8 Unadjusted Means for Adult Outcomes by Age 28
- S9 Adjusted Means with IPW Attrition Correction and Robust Standard Errors for Adult Outcomes by Age 28
- S10 Unadjusted Means by Subgroups and Program Components
- S11 Adjusted Means for Selected Adult Outcomes by Subgroups and Program Components
- S12 Adjusted Means with IPW Attrition Correction and Robust Standard Errors for Adult Outcomes by Age 28 (Dosage of Program Components)
- S13 Main Effects of Selected Outcomes for Three Measures of CPC Participation and the Percentage Reduction in Effects Associated with Five Hypotheses of Mediation
- S14 Standardized Coefficients for Models in which CPC Program Participation Predicts Mediators and Mediators Predict Selected Outcomes

Supplementary Figures

- S1 Flowchart of Study Sites and Participants in the Chicago Longitudinal Study (Preschool to Age 28)
- S2 Child-Parent Center Program
- S3 Frequencies of Selected Outcomes
- S4 Robustness Results for Insurance and Substance Abuse by CPC Program Components
- S5 Five-Hypothesis Model of Early Education to Adult Well-Being
- S6 Densities Functions by CPC Participation (Preschool, School-age, and Both) and by Treatment Status

Supporting Online Material

1. Materials and Methods

1.1. Study Background

The Chicago Longitudinal Study (CLS) is a life course investigation of the influence of early childhood experiences on health and well-being (1-4). Based on a same-age sample of 1,539 children who attended early childhood programs in the Chicago Public Schools, this prospective study has tracked participants to the end of the third decade of life. About two thirds of participants (N = 989) attended the Child-Parent Center (CPC) Education Program beginning in preschool and one third (N = 550) attended an alternative program in kindergarten as part of the Chicago Effective Schools Project. Seventy (70) percent of the total sample (N = 1,073) attended preschool in 1983-1985, and the entire cohort completed kindergarten in June 1986.

CLS participants were born in 1979 and 1980 and grew up in high-poverty neighborhoods throughout the city. Reflecting the racial and ethnic composition of the local contexts, 93% of the sample is African American and 7% are Hispanic. The neighborhoods in which participants resided were the most disadvantaged in Chicago. The neighborhood poverty rate for study members was 2.5 times that of other areas (39% vs. 15%; 1980 census) and double the citywide average of 20% (5). Three quarters of participants lived in areas in which 60% or more of residents were low-income, defined by 185% of the federal poverty line or below.

The four major goals of the CLS are to (a) document patterns of well-being in multiple domains from school entry through adulthood, (b) assess the impact and cost-effectiveness of the CPC program, (c) identify and better understand the generative mechanisms through which the effects of early childhood experiences are transmitted to well-being, and (d) investigate the contributions to well-being of personal, family, school, and community factors, especially those that can be altered by program or policy intervention.

In this report, data are included from birth to age 28, up to 25 years after program enrollment at ages 3-4 years. Data have been collected from many sources thus enabling comprehensive examinations of the predictors of well-being over time and the processes through which they occur. These include birth and school records; parent and teacher surveys; participant surveys from third grade into adulthood; standardized tests over the school-age years; child maltreatment and justice system records; educational attainment, adult earnings, employment, and public aid; and family and parenting behaviors (3, 4).

The CLS is currently in the adult phase and examines links between early childhood intervention and well-being from age 24 onward (3, 4, 6). In three earlier phases, the study has investigated the multi-level predictors of early childhood development by age 10 (7, 8), middle childhood and adolescence up to age 18 (9, 10) and the transition to adulthood from ages 18 to 24 (11-13). Sample sizes in early childhood, adolescence, and the adult transition were, respectively, 1,246, 1,268, and 1,372. In the adult phase--the focus of this report--it is 1,386. This includes participants with valid data on educational attainment or socioeconomic status. The study sample range for other outcomes is from 1,233 to 1,473.

1.2. Design and Study Sample

The original CLS sample included the complete cohort of 989 children who completed preschool and kindergarten in all 20 CPCs (3, 5) and 550 low-income children who did not attend the program in preschool but participated in a full-day kindergarten intervention program in five randomly selected schools of the Chicago Effective Schools Project and in those affiliated with the CPCs (11, 14). 15% of the comparison group attended Head Start preschool with most

others in home care. Thus, the comparison group enrolled in the usual early childhood interventions available for low-income children in the Chicago public school system. School-age services were provided in first to third grades in affiliated schools regardless of children's preschool or kindergarten participation. Figure S1 shows the patterns of participation. Table S1 shows descriptive information for the program and comparison groups.

In this alternative-intervention, quasi-experimental design, the comparison group matched the program group on age, eligibility and participation in intervention, and neighborhood and family poverty. Eligibility criteria for the program were (a) residence in a school attendance area receiving federal funds from Title I of the 1965 Elementary and Secondary Education Act (for school districts serving high proportions of low-income children), (b) demonstration of high educational need due to poverty-associated factors, and (c) parents agreed to participate up to a half day per week. That the program was a sustained intervention with positive evidence of effectiveness and was dedicated to serve those most in need made it impossible to randomly assign groups to intervention (5, 11, 15). As a consequence, cross-condition contamination was avoided, which is most likely to occur in innovative and desirable interventions. For example, contamination effects (noncompliance) were observed in the randomized study of the National Head Start/Public School Early Childhood Transition Demonstration (6, 16). In support of interpretability of estimates as program effects, findings have been consistent across alternative comparison groups; model specifications and assumptions groups (11, 17, 18), and are largely explained by mechanisms central to the intervention theory (5, 18, 19).

1.3. Validity of CPC and Comparison Group Contrasts

Five study features make group comparisons interpretable as program effects. First, the comparison group was chosen primarily from randomly selected schools participating in full-day kindergarten and other school services, which exceeded the usual "treatment" at the time. By comparing groups that received different intervention services (e.g., Head Start), findings test the impact of CPC above and beyond other available early childhood services. This contrasts results in a conservative bias compared with many previous studies. Indeed, all comparison participants attended full-day kindergarten while only 60% of CPC participants did.

Second, most children in the comparison group did not enroll in the program because they did not live in a CPC attendance area. Home residency rather than parent interest determined participation. The process of participation in school-age and extended intervention yielded similar levels of equivalence. The school-age program was open to any child regardless of their level of preschool participation. In most cases, enrollment for 2 versus 3 years was a school administrative rather than a parent decision since the school-age program was limited to second grade in some sites and third grade in others. Extended intervention yielded a similar pattern. Enrollment for five versus six years was determined largely by the school administrative decision to go through second versus third grade. Unmeasured factors differing between preschool and extended intervention participants are implausible given prior findings that growth rates in school achievement between the beginning and end of kindergarten were identical for preschool and the preschool plus school-age groups (20).

Third, more than 80% of children in the neighborhoods of the centers participated in the program, which indicates that program enrollees are representative of the center neighborhoods. This also was due to the centers being located outside of Head Start attendance areas. Because CPCs were located in the highest poverty areas of the city that had no other preschool programs further indicates saturation of program coverage and the greater economic disadvantage of the CPC neighborhoods. Notably, staff enrolled children most in need of intervention through extensive outreach activities and door-to-door canvassing.

Fourth, the pattern of effects over time is largely explained by mechanisms central to the intervention theory, including the enhancement of cognitive and literacy skills, family support behaviors, and the quality of later school environments (5, 21, 22). These findings are part of the confirmatory approach for strengthening validity (18).

Finally, results have been consistent across a wide range of robustness testing by model specification, assumptions, and alternative comparison groups (3, 11, 22). In further support of validity, our findings in this report show robustness across different model specifications and propensity score analyses (Figure 2; Table S7 and Figure S4). Consequently the reliability of the overall effects and by subgroups is strengthened.

1.4. Adult Follow-up Sample and Group Comparability

At an average age of 28 years, 90.1% (N = 1,386) of the original sample had valid data on educational attainment or employment by August 31, 2008 (Figure S1). Recovery rates for the program and comparison groups were 91.0% and 88.4%, respectively. Recovery rates were relatively high for occupational prestige at age 24 (N = 1,335; 86.7%), public aid (N = 1,335; 85.4%) and SES (income and education) at ages 24-27 (N = 1,265; 82.2%) (Table S1). The high rates of sample recovery are due to the use of many sources of administrative and survey data and persistent tracking of CLS participants. About two thirds of the sample resided in Illinois between ages 20-28, with many others remaining in the Midwest. No evidence of selective attrition for the overall sample has been detected (11, 15, 23).

Tables S2a-S2c show the characteristics of the program and comparison groups at the age 28 follow-up. Child and family characteristics were measured from administrative records (birth records, public aid receipt) and family and participant surveys assessing preprogram characteristics primarily from birth to age 3. The *p*-values show the significance of the group differences at follow-up and at the beginning of the study (original sample).

Among the follow-up sample, program and comparison groups were similar on most attributes, including low birth weight, race, child welfare history, single-parent status, mother's employment, financial problems, family conflict, and economic disadvantage (i.e., AFDC receipt and eligibility for subsidized meals). This is best reflected by the risk index, the sum of eight dichotomous family risk indicators. Each group experienced an average of 4.5 demographic risks early in life.

At the follow-up, the program group had a higher proportion of females, a higher proportion of parents who completed high school, and a higher rate of enrollment in high-poverty schools. The latter difference is the result of the centers being located in the most economically disadvantaged school areas. Group comparisons of preprogram characteristics for the original sample show similar equivalence on background characteristics to those of the follow-up sample (11, 15). Among males, program and comparison groups were equivalent on all child and family preprogram attribute (Table S2a).

We note two additional findings. First, group differences in parental education are largely accounted for by other demographic characteristics such that the significant difference on high school completion is no longer detected once the other attributes in Table S2 are taken into account. Indeed, group differences on parent education only exist for females. Second, measures of home environment, assessed retrospectively from the adult survey, show that relative to the comparison group, CPC participants reported similar albeit higher levels of problems such a family conflict and financial difficulties.

1.5. Child-Parent Center (CPC) Education Program

The CPC program is described fully in previous reports (5, 6, 23). Implemented in the

Chicago Public Schools since 1967, it provides educational and family support services between the ages of 3 and 9 (preschool to second or third grade). The program developer Lorraine Sullivan described the philosophy as promoting a nurturing learning climate: "In a success-oriented environment in which young children can see themselves as important, they are 'turned on' for learning. Attitudes toward themselves and others, interest in learning, increased activity, conversation, and enthusiasm are all evidences of the change. Parents are increasingly aware of the role of the home in preparing children for school and have renewed hope that education will develop the full potential of their children" (p. 70) (24).

Within a structure of comprehensive services similar to Head Start, the intervention emphasizes the acquisition of basic skills in language arts and math through relatively structured but diverse learning experiences. These include teacher-directed whole-class instruction, small-group and individualized activities, frequent field trips, and play. Literacy experiences involving word analysis, oral communication, and listening skills are central to the model. Frequently used curricula included Peabody Language Development Kits, AlphaTime, Language Lotto, Bank Street Readers, Math Their Way, and the school district's activity-based curriculum EARLY (5). Based on an ecological framework, family support services are designed to strengthen the family-school relationship through parent involvement in the center and for the benefit of the child. This participation is expected to encourage continuing involvement into the elementary grades (5).

Each center is directed by a head teacher and two coordinators (Figure S2). All teachers have bachelor's degrees and are certified in early childhood education. The parent-resource teacher coordinates the family-support component. The paraprofessional school-community representative provides outreach to families. Major elements of the intervention include: low child-to-staff ratios in preschool (17:2), kindergarten (25:2), and the primary grades (25:2); an intensive parent program that includes parenting education, volunteering in the classroom, attending school events and field trips, furthering education and degree completion, and home visitation; and health and nutrition services, including screening and diagnostic services, speech therapy, meal services, and referrals by program nurses. Parents are expected to participate in the program up to a ½ day per week through a variety of supported activities. About three quarters of CLS parents reported participating at least twice per month (25). The most prevalent activities were attending school meetings, going on class field trips, volunteering in the classroom, and attending programs in the parent resource room. Over 70% of respondents indicated engaging in each of these activities. Given the substantial resources devoted to parent involvement, this level of participation is higher than for most other early childhood programs (26). Previous studies have found that parent involvement is a major mechanism through which program participation affects later child well-being (19, 27, 28).

The preschool program is 3 hours per day, 5 days a week during the school year, and usually includes a 6-week summer program. After full-day or part-day kindergarten, school-age services are provided under the direction of the curriculum parent-resource teacher. Like the preschool/kindergarten component, a staffed parent resource room is available in each site. The school-age intervention is open to any child in the school, either in first and second grade in 14 sites or first through third grade in 6 sites. In the CLS, the rate of participation of eligible children was high as the program was located in areas not served by other preschools, and nearly all families could not afford private child care. In retrospect reports when CLS participants were in high school, parents of 109 comparison participants indicated participation in any other out of home care (primarily Head Start) from birth to age 4. In addition, CPC staff conducted extensive outreach in neighborhoods to enroll families most in need, and, to maximize participation, services were comprehensive in scope and tailored to family needs.

1.6. Outcome Measures

The outcomes were conceptualized as indicators of adult well-being synonymous with positive health, mental health, and economic productivity (29, 30). Expanding on previous studies (11, 15), the indicators were theoretically related to the ultimate goals of the CPC program, which is the enhancement of life-course functioning including economic independence and socio-emotional competence.

Data were collected from participant interviews at ages 22-24 and administrative records between ages 23 and 28 and from local, state, and federal agencies. These, including the Illinois Shared Enrollment and Graduation Consortium, the Illinois Department of Employment Security, the Illinois Department of Health and Human Services, the Circuit Court of Cook County, the Illinois Department of Correction, the Department of Motor Vehicles, and the Federal Bureau of Prisons. Table S3 shows the sources of data for measures of adult well-being. The periods of data collection varied. Occupational prestige was collected through December 31st, 2004 (mean age of 24.6 years). Criminal justice system data were collected through December 31st, 2006 (mean age 26.6). Educational attainment data were collected through August 31, 2008 (mean age 28.3). Finally, socioeconomic status, public aid, health insurance, substance abuse, and family status data were collected through December 31, 2007 (mean age 27.6).

Educational attainment. Six measures of educational attainment by age 28 were assessed: (1) On time graduation indicated whether participants graduated from high school by 1998; (2) High school completion measured whether participants finished their high school education with an official diploma or received a GED or equivalent credential. All others were coded as “non-completers.”; (3) Highest grade completed was an ordinal indicator ranging from 3 to 19 (19 = completed a professional degree). Those completing high school or the GED were coded 12. Postsecondary education was derived from the number of credits earned in college courses; (4) College attendance measured earned credits in college courses; (5) 4-year college attendance measured whether participants earned credits in institutions granting a bachelor’s degree; and (6) BA or AA completion measured whether participants earned a bachelor’s or associate degree. Measures were derived from administrative records from colleges and universities in Illinois (31) and other states, K-12 schools, and brief surveys of CLS participants or family members.

Socioeconomic status (SES). SES was assessed from age 24-27. Measures were derived from quarterly income and unemployment insurance records from the Illinois Department of Employment Security, as well as participant interviews completed between ages 22-24. Occupational prestige by age 24 was measured through two variables (46, 47). Employing self-reported occupational information on participants’ current and previous two episodes of employment, participants who completed the adult survey were assigned an occupational prestige/skill score between 1 (low prestige/skill) and 9 (high prestige/skill). Occupational prestige for participants was based on ratings from the 1989 General Survey (32) and the Barratt Simplified Measure of Social Status (33), adapted from the 9-point Hollingshead Index of Social Status (34, 35). Table S4 shows the Occupational Prestige Scale used.

A dichotomous measure was created to distinguish between participants reporting low prestige/skilled occupations (occupational prestige/skill of less than 4) and participants reporting moderate to high prestige/skilled occupations (occupational prestige/skill of 4 or more). Moderate to above occupational prestige signifies semi-skilled work typically requiring post-secondary education or training. Missing occupational data was supplemented with incarceration, employment, and education data.

A composite measure of SES was constructed from data on educational attainment and employment income. Educational attainment by age 26 (August 31st, 2006) was coded into a 5-point scale: 0 = high school dropout; 1 = completed GED; 2 = high school graduate; 3 = some post-secondary no degree, associate degree, or certificate; and 4 = 4-year degree or higher. Similarly, average annual income (2007 dollars) between ages 24-27 was coded into a 5-point scale: 0 = \$0-\$8,999; 1 = \$9,000-\$13,999; 2 = \$14,000-18,999; 3 = \$19,000-24,999; and 4 = \$25,000 or more. For each participant, a combined score was generated from the sum of the assigned educational attainment and income scores. In addition, a dichotomous SES measure was created to identify participants with moderate to above SES (combined scores of 4 or more).

To measure general SES, a dichotomous variable indicated whether participants completed a degree (bachelors or associates) by age 26 and/or had a stable work history, defined as 8 or more quarters of employment between 2004 and 2007.

Full-time employment was measured from interviews completed between ages 22-24 and defined as 35 or more hours per week. Survey data were supplemented with employment earnings data from the Illinois Department of Employment Security. Participants were assumed to be employed full-time if they had earnings of \$5,000 or more for 8 or more quarters between 2004 and 2007.

Administrative data on quarterly income from the Illinois Department of Employment Security were used to estimate average annual income between 2004 and 2007. Income data were supplemented with information from interviews as well and incarceration and public aid data. Five categories of annual earnings in 2007 dollars were constructed (0 = \$0-\$8,999; 1 = \$9,000-\$13,999; 2 = \$14,000-18,999; 3 = \$19,000-24,999; and 4 = \$25,000 or more). Each CLS participant was assigned the median value for their income bracket. The natural logarithm was used in the analysis. In addition, a dichotomous measure identified participants with average annual income of \$14,000 or more.

Public aid receipt. Public aid participation was measured through enrollment in TANF and Food Stamps from ages 18-23 and ages 24-27. Data were from the Illinois Public Assistance Data Base maintained on behalf of the Illinois Department of Human Services (36). Number of months of enrollment and the cumulative prevalence were analyzed for CLS participants residing in Illinois in 1999 or later. For TANF and Food Stamps, 2 measures were created: (1) any participation; and (2) two or more years of participation.

Health status and behavior. Health insurance coverage, from public and private (typically employer-based) sources, was assessed by age 27. Public insurance information was from state-level Medicaid records and CLS participant responses between ages 22-24 to interview questions regarding current health insurance coverage. Private insurance coverage was determined from responses to adult interview questions (e.g., “Do you get health benefits from your employer?”) and was supplemented with administrative data from the Illinois Department of Employment Security as well as post-secondary institutions in Illinois. CLS participants who earned at least \$5000 in 7 or more quarters between 2004 and 2007 and/or completed 31 or more course credits at a 4-year college (equivalent to one year) by age 25 (August 31st, 2005) were assumed to have had private health insurance between 2004 and 2007.

Two indicators of substance abuse between ages 16-26 were assessed. First, a dichotomous variable indicated whether participants were charged and convicted of drug possession between ages 16-26 and/or reported one or more of the following at the time of the age 22/24 adult survey: a) current use of marijuana or harder drugs; b) substance use problem; and/or c) substance abuse treatment. Second, a measure of drug and/or alcohol abuse between ages 16-26 indicated whether CLS participants satisfied the above criteria for substance abuse and/or had a motor vehicle record of “driving under the influence” and/or reported frequent alcohol

consumption. Data for both measures were from adult interviews, and were supplemented with official conviction records through age 26 (37).

Crime and justice system involvement. Arrest, conviction, and incarceration histories from ages 18-26 were obtained from archived Cook County, Illinois circuit court records, the Illinois Department of Corrections, and the Federal Bureau of Prisons. Additional county-level data were obtained from all counties representing Wisconsin and Iowa, as well as Hennepin County, which encompasses Minneapolis and St. Paul, Minnesota. State and Federal incarceration data were also compiled for participants detained outside of Illinois. Administrative data were supplemented with information from adult interviews. Arrests were assessed with a measure of the number of arrests between ages 18-26 and a dichotomous measure identified participants who had been arrested one or more times over the same time period. Arrests for felony charges were measured similarly. Arrests for charges of violence and convictions were also measured similarly. In addition, a measure of incarceration identified CLS participants who were sentenced to a state or federal correctional institution or to a county jail beyond 30 days between ages 18-26.

Family status. Five measures of family status were assessed. Measures were derived from adult interviews and supplemented with administrative records from the Illinois Department of Human Services and other sources through age 27. Parenting indicators included age at the birth of the participant's first child (if any), a dichotomous indicator of parenthood (i.e., gave birth or fathered one or more children) by age 27, the number of children, and whether the participant had three or more children. Marital status assessed whether CLS participants were married or lived with a partner between ages 23-27.

Table S5 presents descriptive statistics for the measures of well-being, program participation, and the covariates. Figure S3 shows the frequency distributions for six outcomes; Highest grade completed in education, occupational prestige, average annual earnings, age at first adult arrest, number of arrests, and number of felony arrests.

1.7. Covariates

Measures of preprogram attributes were from birth records, interviews with CLS participants and parents, and administrative records provided by the Illinois Department of Child and Family Services, the Illinois Department of Health and Family Services, and the Chicago Public Schools. School and neighborhood poverty status were from U. S. Census records. As shown in Table S2a, the preschool intervention and comparison group were similar on most child and family characteristics measured primarily from birth to age 3. Table S2b and S2c show similar patterns for the CPC school-age and extended intervention and comparison groups.

1.8. Analytic Strategy

Following previous reports (11, 15), program effects were estimated by probit, negative binomial, and multiple regression in STATA statistical software (38). For each adult outcome measured up to age 28, the effects of CPC preschool at ages 3 and/or 4 (1 to 2 years) and CPC school-age intervention at ages 6 to 9 (1 to 3 years) were estimated simultaneously with two dummy-variables. Children's school-age participation did not depend on earlier preschool participation.

The effects of CPC extended intervention were assessed in two ways and separate from preschool/school-age participation. The first was with a dummy variable indicating participation or a total of 4 to 6 years (preschool to second or third grade) versus all other children who had less extensive or no CPC intervention (0 to 4 years; extended-1 contrast). This contrast assessed

whether children receiving the full program did better than others regardless of intervention experience. The second extended intervention contrast was between the 4- to 6-year group and children who attended only CPC preschool and kindergarten (1 to 3 years; extended-2 contrast). This estimate assessed the added value of continuing intervention above and beyond preschool and kindergarten. Unlike other models, achievement at the end of Kindergarten (word analysis scores on the Iowa Tests of Basic Skills) was included for the extended-2 contrast. Note that with this addition any synergistic effect of the combined components is removed.

Findings are reported as adjusted means or percentages and group differences after corrections for three types of potential biases in estimation. First, 15 covariates were included in the model to adjust for measured differences in child and family background and early experiences between groups. With the exception of public aid, subsidized lunches, and home environment, the covariates were measured from birth to age 3 from administrative records from the State of Illinois (e.g., birth records, public aid, child welfare) or family surveys. A dummy code for missing data on the covariates also was included in the models to assess if estimates based on multiple imputation were associated with program outcomes. Estimates from this model were compared to the unadjusted group differences.

The second bias reduction strategy was that estimates were corrected for attrition by Inverse Probability Weighting (IPW) (39, 40), which is also called Inverse Probability of Treatment Assignment Weighting (IPTW). In this approach, the predicted probability of being in the recovery sample ($R = 1$; otherwise 0) is estimated for each outcome measure via probit (or logit) regression conditioned on a set of predictors (X) hypothesized to influence sample recovery. The first propensity score was estimated as follows:

$$P_{1i} = \Pr(R = 1|X)$$

The model included 26 variables including program participation and the covariates in Table S6a. The inverse of this predicted probability ($1 / P_{1i}$) was used as a weight variable in all outcome models after verifying that data were missing at random (controlling for X s) and that propensity distributions between groups overlapped. The IPW approach has been found to be more efficient than other propensity methods in that it yields the lowest variances and standard errors in large samples (22, 41-44). Furthermore, it is estimated independently of the outcome model specification. Unlike propensity score matching, IPW uses all available data and can be combined with other propensity scores (e.g., program selection) to efficiently estimate double or more complex adjustments (41, 44, 45). Previous studies of CPC effects have not tested these approaches. Tables S6a to S6d and Figure S6 show further descriptive results and supporting evidence. Tables S6e to S6g report the robustness findings for the predicted propensity scores for preschool, school-age, and extended intervention.

Findings were also reported for models using IPW weights (P_{2i}) for selection into each of the intervention components and combined models (P_{3i}) based on the product of the IPW attrition and IPW program selection weights. These two additional scores were estimated as follows, in which T denotes participation in the program ($T = 1$; otherwise 0) and X a set of covariates:

$$P_{2i} = \Pr(T = 1|X)$$

$$P_{3i} = P_{2i} * P_{1i}$$

The estimated model for program selection (preschool, school-age, and extended intervention) was based on 17 preprogram predictors with weights $1/P_{2i}$ for the program group and $1/(1 - P_{2i})$ for the comparison group (Table S6b). To test robustness, propensity score matching and regression-based propensity score adjustments were conducted for program selection using the same estimated propensity score but utilizing case-by-case matching or entry of the propensity score as a regressor in the outcome model.

The third and final bias reduction strategy involved corrections for clustering by 25 program and comparison group sites (intra-class correlation). Although improving efficiency of estimates (robust standard errors), these made little difference given the length of time between program participation and the measurement of outcomes.

To enhance interpretability, coefficients from probit and negative binomial regression were transformed to marginal effects. Group differences at the .05 probability level were emphasized. To test effects by child, family, and program attributes, the significance of interactions terms, which were added to the model described above, was set at .05 with interpretations reserved for outcomes showing overall effects. Domains in which more than one indicator was found to be significant were also emphasized in reporting.

1.9. Background on Propensity Score Procedures

Nonrandom attrition presents a potential threat to accurate estimation of program effects in all research designs. In the presence of attrition, the potential bias arises from the fact that people who leave the sample can have different characteristics than people who stay in the sample which causes an imbalance between the initial sample and the final (retained) sample. We used various propensity score approaches to control for attrition bias: matching with one-to-one neighbor, kernel, and radius as well as propensity score weighting. Similar effects were found when we applied the alternative methods. We estimated primary results using IPW because the technique is increasingly common and achieves the lowest possible asymptotic variance among methods (46). Although a disadvantage of IPW is that extreme scores (close to 0 or 1) producing large weights can yield unstable estimates, this did not appear to be an issue in the analyses.

We also assessed propensity score approaches for program selection in robustness analysis. Because previous studies have investigated potential selection bias into the CPC program (15, 17, 20, 43, 47), our report emphasizes propensity score adjustment for attrition. We do, however, test the interaction between attrition and selection through IPW.

Propensity score methods can produce unbiased estimates when response assignment is strongly ignorable. This occurs when the response assignment and the potential outcomes are conditionally independent given the covariates X : $\Pr(R|X, Y) = \Pr(R|X)$. Attrition-related factors associated with the ability to track participants include neighborhood mobility as a proxy of residential mobility and whether or not we know a participant's social security number. The ignorability assumption also implies that all relevant differences between the retained and missing groups are captured by their observed covariates. Given the large amount of longitudinal data available for participants from a variety of administrative and survey sources, covariates are comprehensive and control well for differences between the final sample and those missing adult outcome data. For this reason and because we used a placebo test to assess ignorability, we are confident the ignorability assumption is satisfied (43).

In the CLS, we collected outcome measures denoted as Y (e.g. highest grade completed, SES, felony arrest) on a sample of n participants. Information on these outcomes is missing for some participants. Let

$R_i = 1$ if Y_i is observed
 $= 0$ if Y_i is missing

$T_i = 1$ if the individual participates in the CPC program
 $= 0$ otherwise

X = covariates

$\hat{\rho}$ = estimated propensity score probability for attrition representing P_{1i} (see above)

$\hat{\pi}$ = estimated propensity score probability for selection representing P_{2i}

Under the ignorability assumption and the common support assumption, $0 < \text{Prob}\{R = 1 | T = t, X = x\} < 1$ for x , we assume the propensity score is bounded away from 0 and 1. Following (92), the average treatment effect (ATE) on respondents, taking into account sample attrition is identified by:

$$ATE = \Delta_{IPW} = E \left[\frac{R_i Y}{\hat{\rho}(1, X)} / T_i = 1 \right] - E \left[\frac{R_i Y}{\hat{\rho}(0, X)} / T_i = 0 \right] \quad (1)$$

where the response propensity score given (T, X) , is defined as $\rho(T, X) \equiv \text{Pr}(R = 1 | T, X)$. Thus, weighting observations by the inverse of their respective response propensity score identifies the ATE. Formally, the missing data process that we are assuming in this study is missing at random (MAR), which means that attrition is explained by a set of observed characteristics represented as the X variables used as covariates. Researchers (44, 48) have used this IPW to adjust for missing data in regression models.

Implementation of propensity score weighting to control for attrition begins with fitting a binary response model that predicts the probability of sample recovery (R_i) for each outcome, given the covariates, X (child characteristics, family risk factors and neighborhood characteristics). The estimated probabilities generated by a single probit regression are the propensity scores used to construct the weights. Participants are assigned weights equal to the inverse of the predicted probability of being retained. As a result, individuals with overrepresented intervention status, given their covariates, get smaller weights. This reweighted sample more closely resembles a randomized sample in which each individual has the same probability of being included.

We calculated different probabilities of being retained in the sample according to the group of outcomes and the age of participants. Sample sizes varied by outcome because data were obtained from different sources. The probability of being observed in each of the outcome samples was estimated (e.g., educational attainment, SES, crime; Tables S6c and S6d). The outcome models were then tested weighting by the inverse of each respective propensity score ($1/P_{1i}$). Figure S6 shows the similarity of the density plots for estimated propensity scores for different program groups.

Robustness checks. We further examined the robustness of coefficients considering alternatives methods to reduce/eliminate bias. This included estimating the effects of CPC participation adjusting for program selection as well as program selection and attrition.

For selection, we used two similar assumptions, ignorability and common support. The

ignorability assumption is satisfied when the treatment assignment, T , and the potential outcomes, Y , are conditionally independent given the covariates X : $\Pr(T|X, Y) = \Pr(T|X)$. This assumption is different than the one described for attrition in the sense that the factors that explain participation in the program (T) are different than the factors that explain retention (R). For example, factors accounting for CPC preschool participation are: age of the child in months, a measure indicating if the child is underage or overage at the time of CPC preschool participation; and neighborhood characteristics, because the CPC program was offered in impoverished neighborhoods that were eligible for Title 1 funding. The common support assumption, $0 < \text{Prob}\{T = 1 | X = x\} < 1$ for x , also assures that the treatment propensity score is bounded away from 0 and 1, which rules out arbitrarily large weights and reestablishes internal validity. Thus the average treatment effect taking into account only sample selection is identified by:

$$ATE = E \left[\frac{T_i Y_i}{\hat{\pi}(X_i)} - \frac{(1-T_i) Y_i}{1 - \hat{\pi}(X_i)} \right] \quad (2)$$

Equation (2) is used to estimate the effect of CPC participation on different outcomes. We also estimate the effect of CPC participation correcting for both selection and attrition. To do that, we first need to re-write equation (1). The assumption that the covariates, X , are the same for both treatment and comparison groups is relaxed, and given outcomes for only the retained variables, equation (1) is re-written as:

$$ATE = \Delta_{IPW} = E \left[\frac{T_i Y}{\hat{\rho}(X)} - \frac{(1-T_i) Y}{1 - \hat{\rho}(X)} \middle| R = 1 \right] \quad (1')$$

Equation (1') reweights the outcomes of respondents by the inverse of the treatment and non-treatment propensity scores. To identify the treatment effect, we control for differences in the distribution of the covariates across treatment and control groups. Because the model is estimated only for those with valid outcomes, the average treatment effect taking into account both sample selection and sample attrition is the combination of equations (1') and (2):

$$ATE = E \left[\frac{T_i Y_i}{\hat{\pi}(X_i) \hat{\rho}(X_i)} - \frac{(1-T_i) Y_i}{[1 - \hat{\pi}(X_i)][1 - \hat{\rho}(X_i)]} \right] \quad (3)$$

$$= \frac{1}{n} \sum_{i=1}^n \frac{T_i Y_i}{\hat{\pi}(X_i) \hat{\rho}(X_i)} - \frac{(1-T_i) Y_i}{[1 - \hat{\pi}(X_i)][1 - \hat{\rho}(X_i)]}$$

This IPW approach has been widely used in medical experiments (44, 48, 49), the social sciences (45, 92), and is applied to selection, attrition, and a combination of the two. Although the IPW approach is usually efficient relative to other matching estimators (39), we did conduct additional analyses using alternative techniques in an attempt to eliminate potential biases. We examined different propensity score approaches: matching with one-to-one neighbor, kernel matching, Mahalanobis matching, propensity score weighting, and propensity score as a

regressor. We present these results on table S7a. In the case of matching techniques, we only show the results for bi-weight kernel matching, because its effects are similar to the average effect of all the mentioned matching methods. Moreover, bi-weight kernel is the most commonly used technique because it is bounded and simple to calculate. Also, the decision of which estimator is most appropriate for a given data analysis requires knowledge of which parts of the data generating distribution can most reliably be modeled and estimated from available data. The CLS provides comprehensive information on participants since birth, their families, and the broader social context. This strengthens confidence that correction methods relying on observables are feasible and will result in unbiased estimates.

Our decision to use the IPW estimator is based on the less restrictive assumption of a correct specification of the probability of CPC participation given observed covariates at or before the treatment, and the probability of attrition given observed covariates at or before attrition. In contrast, both the double robust method and maximum likelihood estimator require correctly specified models for all outcome equations. Because we were interested in whether CPC participation impacts well-being, and at what levels of dosage, the covariates were the same for all outcomes. Another methodology to correct for selection and attrition could affect the consistency and interpretation of findings from one model to another.

Table S7a shows the effects of CPC preschool, school-age and extended intervention on selected adult outcomes, when using a matching technique, a regression propensity score approach, and inverse probability weighting to correct for attrition. All three techniques yielded similar results. Table S7b displays results for additional robustness analyses. The first relates to the possibility of selection bias. Individuals participating in the CPC program were matched at the beginning of the study with individuals who were similar in every observable way other than treatment. Preprogram characteristics show that both groups are well-matched. Moreover, previous studies investigating the possibility of selection bias using latent variable, bounding, and fixed effects approaches show no evidence of bias (17, 43, 47). Further results are reported in Section 2.5. Also see Tables S6a to S6g and Figure S6 for additional supporting evidence.

Our estimates are more conservative when using the IPW attrition correction in contrast to using the selection correction or both corrections. We emphasized the estimates from attrition.

2. Supporting Text

2.1. Research Background

In a previous study of the CPC program (11), preschool participation was associated at age 24 with higher educational attainment, a higher rate of health insurance coverage and with lower rates of felony arrest, incarceration, and depressive symptoms. Extended intervention into the school-age years was associated with higher educational attainment and rates of full-time employment. Due to the age of assessment in young adulthood, a full range of economic, health, and family outcomes was not investigated such as socioeconomic status, substance use, private insurance coverage, and parenting status. Moreover, systematic tests of variations in impact by program, child, and family subgroups were limited to gender and family demographics. Although attrition and selection bias did not appear to bias estimates, it was not incorporated in model estimation. To the extent that subgroups had greater attrition and this varied by program participation, estimates could be adversely affected.

In assessing the long-term effects of a large-scale and sustained school-based program, the CLS addresses many shortcomings of previous research. One is that evidence on long-term effects is primarily limited to small-sample efficacy trials (14, 50-53). The program characteristics of efficacy studies do not closely match those of contemporary and routinely

implemented public programs. The effects of large-scale, sustained programs into adulthood have rarely been investigated, especially for economic, social and health outcomes. No studies of sustained public-funded programs have continued past age 25. Despite the increasing evidence of positive effects of early intervention in the U.S. and other countries (54-56) and for varying levels of family income (57, 58), enduring effects of participation are difficult to achieve, as indicated by follow-up studies of Early Head Start (59) and Head Start (60) as well other programs (61).

Another shortcoming of research is inadequate attention to program dosage, a key modifiable characteristic. Programs vary widely in duration and intensity yet the effects of this variation are not well understood. Although some studies show that the length of preschool participation is positively associated with child outcomes in the short-term (17, 62), longer-term effects into adulthood have been rarely investigated, especially for large-scale sustained programs. Moreover, the extent to which services that continue into kindergarten and the primary grades have added or synergistic benefits beyond earlier participation has not been fully assessed.

In addition to program dosage, variations in effects by child, family, and social context have rarely been investigated. Their identification provides important information for tailoring or strengthening services (63, 64). Most previous studies have too small sample sizes to assess a range of subgroup effects. Although some studies show differences in effects by gender (14, 15), this impact varies by study and outcome. Evidence is more consistent that children from higher risk or more disadvantage families experience larger effects than children from less disadvantaged families, but a greater focus on long-term effects is needed.

A final limitation is that attrition is rarely taken into account in estimating the effects of intervention. Longitudinal studies of preschool and other early childhood interventions frequently lose up to 50% of their original samples in adolescent and adult follow-up assessments. For example, the sample recovery rates were 65% in the Infant Health and Development Program (65), 63% in the Houston Parent Child Development Center (66), 55% in the Syracuse Family Development Research Program (67), 55% in the National Impact Study of Early Head Start (68), and 55% in the Cornell Consortium for Longitudinal Studies (69). Large-scale multisite studies are especially problematic in this regard. Attrition can affect the validity of estimates and generalizability of findings. The power and precision of subgroup effects can be especially compromised. Propensity score and related bias reduction methods to account for attrition and other selection processes has led to integrative procedures of estimating longitudinal effects (21, 22, 41).

2.2. Unadjusted Group Means and Differences

Unadjusted rates and mean differences for 4 levels of CPC intervention (preschool, school-age, Extended-1 contrast, and Extended-2 contrast) are presented in Table S8. Over 44% of the CPC preschool group graduated from high school on-time. In comparison, less than 35% of the preschool comparison group graduated on time. By age 28, 80.3% of the preschool group and 72.7% of the comparison group had completed high school. Furthermore, although the rates of college degree completion by age 28 are similar (8.5% vs. 7.6%), a larger percentage of the preschool group attended a 4-year college by age 28 (14.7% vs. 10.5%). In addition, preschool group participants, on average, received higher composite socioeconomic status ratings and appear to have been less involved in criminal behavior.

The rates of on-time graduation for the school-age intervention and comparison groups are 44.4% and 36.5%, respectively. However, by age 28, the disparity in educational attainment was substantially reduced as measured by high school completion (79.3% vs. 75.3%). High school

completion counts not only official diplomas (on-time or not) but GED credentials.

48.6% of participants who received 4-6 years of CPC intervention graduated from high school on-time. In comparison, 36.5% of participants who received 0-3 years graduated on-time. Again, the disparity was reduced by age 28 as measured by high school completion (81.8% vs. 75.2%). Over 38% of participants who received 4-6 years of intervention were assigned composite socioeconomic status ratings of moderate or above. Less than 32% of participants who received 0-3 years of intervention were assigned composite ratings at or above the same threshold.

2.3. Additional Findings on Main Effects

Table S9 shows the findings by outcome domain for each intervention contrast.

2.3.1. Educational Attainment and Economic Well-Being

Preschool participation. Relative to the comparison group and controlling for preprogram characteristics, the preschool group had significantly higher levels of educational attainment for 4 of 6 measures, including highest grade completed (12.2 vs. 11.9, $p = 0.03$) and attendance in a 4-year college (14.7% vs. 11.2%; $p = 0.04$). No differences were found for degree completion.

These educational advantages translated to higher economic status, including occupational prestige (2.8 vs. 2.5; $p = 0.03$; scale of 1-9), SES composite (education and income) score of 4 or higher (34.4% vs. 28.6%; $p = 0.03$; scale of 0-8), and average annual income (\$11,582 vs. \$10,796; $p = 0.02$). Moreover, a higher percentage of the program group had an occupational prestige level (job skill) of 4 or higher (28.2% vs. 21.4%; $p = 0.01$), synonymous with postsecondary training. No differences were detected for employment.

School-age participation. The lone difference was that the school-age group had a higher rate of on-time high school graduation than the comparison group (44.4% vs. 35.3%, $p = 0.01$). For most other educational and economic indicators, the program group had small advantages.

Extended program participation. We emphasize results for the extended-1 contrast (4 to 6 vs. 0 to 4 years of participation). This contrast assesses the likely synergistic effects of preschool and school-age program components. Similar to preschool, the extended-1 group had significantly higher levels of educational attainment, including highest grade completed (12.3 vs. 12.0, $p = 0.01$), occupational prestige (2.9 vs. 2.6; $p = 0.03$), and the SES composite (3.1 vs. 2.7; $p = 0.02$). No significant differences were found in annual income, college attendance or degree completion, and employment.

2.3.2. Public Aid

Preschool participation. No consistent pattern emerged. The preschool group had a lower rate of Food Stamp receipt by age 24 (54.8% vs. 59.6%; $p = 0.04$) but this did not continue to age 27. They also had a lower rate of participation in TANF for two or more years by age 27 (1.6% vs. 2.2%; $p = 0.06$).

School-age participation. Relative to the comparison group, the school-age group had a lower rate of Food Stamp receipt from ages 24-27 (43.9% vs. 52.0%; $p = 0.02$). This was not apparent from ages 18-24.

Extended program participation. No group differences were detected for either contrast. The general pattern was that the extended group had slightly lower rates of public aid receipt. Based on the extended-2 contrast, participation was linked to lower Food Stamp receipt from ages 24-27 (45.9% vs. 54.2%; $p = 0.09$).

2.3.3. Health Status and Behavior

Preschool participation. The preschool group had a higher rate of health insurance coverage (75.9% vs. 63.9%; $p < 0.01$), including private insurance linked to employment (49.1% vs. 39.5%; $p = 0.01$). They also had significantly lower rates of substance abuse by age 26 (13.7% vs. 18.9%; $p = 0.01$) and drug and alcohol abuse (16.5% vs. 23.0%; $p < 0.01$).

School-age participation. No group differences were found for any health-related outcome.

Extended program participation. Similar to preschool, the extended program group had a higher rate of health insurance coverage (75.7% vs. 69.6%; $p < 0.01$), including private insurance (51.8% vs. 42.2%; $p < 0.01$). Although in the expected direction, no differences were found for substance abuse.

2.3.4. Crime and Justice System Involvement

Preschool participation. By age 26, the preschool group had significantly lower rates of crime and justice involvement for 3 measures, including arrests for any charge (47.9% vs. 54.3%; $p = 0.03$), felony arrests (19.3% vs. 24.6%; $p = 0.02$), and incarceration/jail (15.2% vs. 21.1%; $p = 0.04$). No differences were detected for the number of arrests.

School-age participation. No differences were found.

Extended program participation. No differences were found.

2.3.5. Family Status

Preschool participation. No differences were found for parenthood, number of children, and marital status. The program group was slightly older at the birth of their first child.

School-age participation. The program group had a significantly higher rate of parenthood by age 27 (65.7% vs. 59.6%, $p = 0.05$). No differences were detected for the other outcomes including the number of children and marital status.

Extended program participation. Following a similar pattern as preschool, no significant differences were found.

2.4. Differences by Subgroup Characteristics

The most consistent evidence of differential effects was for gender of participants and parent educational attainment. We found limited evidence that program effects varied by other child and family characteristics, neighborhood poverty, and dosage within program components. Table S10 shows the unadjusted means by selected subgroups and program components. Table S11 summarizes the subgroup findings for four outcomes: high school completion, SES, substance abuse, and felony arrest.

Gender. Male preschool participants showed substantially higher levels of well-being than the male comparison group participants in high school completion (77.5% vs. 63.5%; $p < 0.01$) and substance abuse (33.7% vs. 42.9%; $p < 0.01$) whereas female preschool and comparison group participants exhibited nearly identical rates (85.4% vs. 86.9%; $p = 0.60$; 3.9% vs. 4.8%; $p = 0.60$, respectively). In contrast, females showed comparatively greater effects of school-age (89.8% vs. 80.3%; $p = .02$) and extended intervention (88.0% vs. 81.6%; $p = .07$, extended-2 contrast) than males (70.0% vs. 75.7%; $p = 0.10$; 74.0% vs. 79.7%; $p = 0.31$, respectively)

Race/ethnicity. For all levels of intervention, impacts were similar for African American and Hispanic participants.

Parent education and family demographics. Preschool participants whose parents were high school dropouts experienced significantly larger effects of intervention than participants whose parents were high school graduates for high school completion, felony arrest, and substance abuse (Figure 1). As shown in Table S11, the preschool participants of high school dropouts had

a rate of felony arrest that was half the rate for the comparison group of high school dropouts. No consistent differences in effects of intervention were detected by single-parent family status, adverse early home environment (e.g., frequent family conflict), and presence of 4 or more family risks. For substance abuse and felony arrest, preschool participants with 4 or more family risks experienced greater preventive effects than those at lower risk.

Neighborhood poverty. Although the general pattern was that children from the highest poverty neighborhoods exhibited greater effects of preschool than those from lower-poverty neighborhoods, only for felony arrest and substance abuse were these differences significant.

Home environment. No consistent pattern emerged between children experiencing adverse home environments from birth to age 5 versus those that did not.

Program dosage. The school-age group with 2 or 3 years of participation had higher rates of on-time high school graduation (41.5% vs. 28.5%; $p = 0.03$) and private health insurance coverage (49% vs. 38.5%; $p = 0.003$) than the 1-year group. With the exception of arrests for violence (14.1% vs 19.3%; $p = 0.019$), length of preschool (2 years vs. 1 year) was unrelated to adult well-being. Extended intervention (5 or 6 years vs. 4 years) was linked to lower rates of arrests for violence for the primary contrast (13.4% vs. 20.8%; $p = 0.002$) and the alternative contrast (extended-2; 14.1% vs. 19.3%; $p = 0.019$). Also for the primary contrast, a greater percentage of the 5- to 6-year group had an average annual income of \$14,000 or more (36.1% vs. 28.1%; $p = 0.027$). S12 shows the adjusted means of adult outcomes by program dosage.

2.5. Robustness by Model Specification

As shown in Table S7a, estimates for preschool, school-age, and extended intervention participation were consistent across eight different specifications ranging from no adjustment to IPW-attrition adjusted, and IPW-attrition and program-selection adjusted models. For the latter, the inverse of the estimated propensity score for program participation (based on 17 predictors) was multiplied by the IPW for attrition and this product was the weight in the model. The marginal effects of intervention applying this double-correction weight supported the beneficial effects of intervention. In this model, the effect of preschool on socioeconomic status (score of 4 or higher) was slightly larger than in the IPW attrition model (5.8 vs. 5.4 percentage points) and slightly smaller on health insurance coverage (10.6 vs. 12.1 percentage points), felony arrest (4.6 vs. 4.8 percentage points) and substance abuse (4.3 vs. 4.8 percentage points). Estimates were unaffected by the number and type of covariates in the model.

Table S7b shows additional robustness results for five outcomes, including felony arrest, substance abuse and health insurance coverage, using the propensity score as a regressor and as a weight. Findings showed a high level of consistency. Figure S4 displays the pattern of impacts for substance abuse and health insurance coverage.

2.6. Mediators of Effects on Well-Being

To determine if the main effects of intervention can be explained by theory-relevant behaviors, we tested the Five-Hypothesis Model (5HM, Figure S5) of early education (18) for SES, on-time high school graduation, high school completion, felony arrest, and substance abuse. In the 5HM, the impacts of intervention are posited to be a function of cognitive advantage, social adjustment (e.g., rule conformity, peer relations), motivational advantage (e.g., school commitment), family support behavior (e.g., parent involvement), and school support (e.g., school quality). The five domains of mediators were assessed together in the full model.

Measured from multiple sources from ages 5 to 21, the indicators were as follows: (a) cognitive advantage: cognitive composite at age 5 (school entry) on the Iowa Tests of Basic Skills (ITBS), special education placement or grade retention by age 15, and ITBS reading

achievement at age 14; (b) social adjustment: teacher ratings of classroom adjustment at ages 7-9 (6-item scale; e.g., “Complies with classroom rules, “Works and plays well with others”), youth ratings of trouble making behavior at ages 9-12 (4-item scale; “I get in trouble at school”, “I get in trouble at home”), and official records of juvenile arrest by age 18; (c) motivation advantage: teacher ratings of achievement motivation at ages 5-6 (23-item scale; “Is eager to learn, “Actively listens to stories”) and youth reports of school commitment at ages 11-12 (32-item scale; “I try hard in school”, “I do my homework”); (d) family support behavior: teacher ratings of parent involvement in school at ages 7-12 (5-point scale; “Parent’s participation in school”) and substantiated reports of child abuse and neglect at ages 4-12; and (e) school support behavior: number of school moves at ages 10-14 (school records) and enrollment in relatively high quality schools at ages 10-14 (magnet schools or schools in which 40% or more of students were at/above national norms in reading and math achievement). High school completion by age 21 was included as a cross-domain indicator of primarily the cognitive advantage, motivational advantage, and social adjustment hypotheses.

Based on these well-established indicators of the model (18, 19), Table S13 shows that the five sets of mediators accounted for 60%-100% of the main effects of preschool and 38%-100% of the main effects of extended intervention. The effects of preschool participation on on-time high school graduation, high school completion, SES, and felony arrest were completely explained by 5HM. The model accounted for 65% of the preschool main effect on average annual income and 60% of the main effect on substance abuse. The effects of extended intervention on high school completion were completely explained by 5HM and nearly so for on-time graduation (a percent reduction of 73.6%). Alternatively, 5HM accounted for only 26% of the main effect of school-age intervention on on-time high school graduation. Note that mediation was assessed only for those main effects showing statistical significance.

Table S14 shows the standardized coefficients for the full model that included all 5HM indicators. The first set of coefficients show the direct effects on the mediators of three measures of CPC participation adjusted for differences in the covariates. CPC preschool participation had relatively large effects on the ITBS cognitive composite (coeff. = 0.28), ITBS reading achievement (coeff. = 0.15), parent involvement in school (coeff. = 0.15), and classroom social adjustment (coeff. = 0.13). School-age participation had relatively large effects on parent involvement in school (coeff. = 0.24), school mobility (coeff. = -0.12), and special education/grade retention (coeff. = -0.10). Extended intervention for 4 to 6 years was significantly linked to parent involvement in school (coeff. = 0.32), school mobility (coeff. = -0.19), ITBS reading achievement (coeff. = 0.16), and school quality (coeff. = 0.14).

The second set of coefficients in Table S14 shows the direct effects of the mediators on five outcomes controlling for other mediators, CPC participation, and the covariates. The most common predictors of adult well-being were juvenile arrest, high school completion by age 21, school quality, child abuse and neglect, and special education placement/grade retention (see also Table S13). Trouble making behavior, parent involvement in school, social adjustment, motivation, and school commitment had less consistent direct effects, although given their earlier ages of assessment, influences also may be exerted indirectly through other mediators. Similarly, the effects of the cognitive composite at age 5 and ITBS reading achievement also would be expected to influence adult outcomes indirectly, especially the cognitive composite. Overall, these findings help corroborate the validity of the main effect estimates.

2.7. Findings in Context

Results should be interpreted within the context of two limitations. First, because the sample was almost all African American and grew up in inner-city Chicago, results may have

limited generalizability to samples with different racial compositions or social contexts. The long history of successful implementation within public schools also indicates that findings should not be expected to generalize to less intensive or lower-quality programs. Alternatively, generalizability is greater than many previous studies in that the program has been implemented routinely within a large public school context for over 4 decades. That many subgroup attributes showed no differences and that findings of other studies of universal programs show benefits is relevant.

A second limitation is that coverage of some outcome measures was limited. Because socioeconomic status stabilizes after age 30 (29, 70, 71), the assessed outcomes may not provide the optimal gauge of economic well-being. Health insurance coverage was assessed cumulatively up to age 26. The age of measurement and coverage period for health insurance coverage varied by participant and was not taken into account. More precise indicators such as the number of months of coverage over particular time intervals would provide valuable information on duration of coverage. Moreover marital and family status had more missing data than other outcomes. These outcomes are dynamic and will vary by age. Further follow-up to the transition to midlife will provide a more comprehensive profile (70).

Of further note is that while inferences based on quasi-experiments are more challenging than well executed experiments, our findings that estimated program effects were consistent across a range of approaches and specifications substantially reduces the plausibility of selection or attrition bias. These findings are consistent with prior studies (11, 15, 17) and with increasing evidence that generative mechanisms associated with the five-hypothesis model of intervention effects can account for the observed pattern of findings. This is part of the confirmatory approach of impact assessment (18, 28).

Findings strengthen knowledge on early childhood preventive interventions. As the first study of a school-based public early intervention into the mid to late 20s, results indicate that intensive educational enrichment can have enduring effects on socioeconomic status, health, and social behavior. They also extend on many prior studies including up to age 24 (11, 15, 23). The most consistent effects were for socioeconomic status including occupational prestige--a measure of job skills, an index of education and income, and income. Both preschool and extended intervention from preschool to second or third grade demonstrated positive effects on economic well-being while school-age intervention impacted only school completion and public aid receipt. Because the avoidable annual costs of crime (72, 73), school dropout (74), substance abuse, and mental health problems (75) exceed \$500 billion, our findings strengthen the evidence that sustained, publicly-funded early educational interventions can be among the most cost-effective strategies for promoting health and well-being. Continued investigation of the CPC program will address the extent to which participation affects a broader set of health behaviors such as chronic disease risk, use of preventive services, health behaviors, and subjective well-being.

The findings indicated that children at higher levels of risk benefitted more from preschool on several adult outcomes. Males (almost all of whom are African American), participants whose parents were high school dropouts, and participants with four or more demographic risks had higher rates of school completion and health compromising behaviors than their lower-risk counterparts. These findings suggest that early interventions can reduce health disparities among socioeconomic and demographic groups, especially if they impact educational success, a key determinant of health and well-being (76-79). These findings demonstrate that the Healthy People 2010 and 2020 goals of increasing quality and years of healthy life and eliminating health disparities (80, 81) can be achieved in part through participation in quality educational programs (76, 82). The comparative advantage found for children at higher levels of risk is consistent with

many of other studies of preventive interventions for children and youth (51, 79, 83, 84). The fact that females benefitted from school-age and extended intervention more than males suggests that differential effects by subgroup may vary by age of services and outcome. In the current study and in contrast to findings for preschool males, the advantage for females for the school-age program was largely due to the reduction in effects for males rather than a large increase for females. For example, the adjusted mean differences were not significant for males and marginally so for females (Table S11). This pattern also did not generalize to other outcomes. It is possible that more complex or higher order interactions involving program, child, and family characteristics are present and are difficult to reliably estimate.

The study also shows the potential limits of the long-term effects of dosage (length) within program components. Although extended intervention for 4 to 6 years (from preschool to third grade) demonstrated positive effects on adult well-being, the number of years of preschool (2 vs. 1) and extended (5 or 6 vs. 4) intervention were unrelated to adult outcomes. For school-age intervention, 2 to 3 years was linked to significantly higher rates of on-time high school graduation. This latter finding is consistent with school-age class size reduction experiments (83, 85) and social skills training (86, 87). These results overall suggest that among high quality programs there may be a threshold beyond which effect sizes diminish or are less likely to be observed. Nevertheless, in previous studies CPC dosage levels were associated with improved child and adolescent well-being. Two years of preschool relative to one year was linked to significantly higher school readiness skills, lower rates of remedial education, and lower rates of child maltreatment and juvenile delinquency (88, 89). Extended intervention for 5 to 6 years relative to 4 years was associated with higher school achievement by age 15, lower rates of child maltreatment, and lower rates of remedial education (5, 15, 20). Investigation of a broader set of adult outcomes and among child and family subgroups will help clarify the extent of dosage effects.

Finally, the findings illustrate the value of identifying effective educational and behavior interventions for promoting life-course well-being. As a comprehensive center-based educational intervention in public schools, the CPC model emphasizes the development of literacy and social skills necessary for school success and intensive family involvement in children's early learning. These features plus implementation by certified teachers in small classes for over 540 hours per year in preschool with continuing services in elementary school are key elements that distinguish the program from others that do not show broad and enduring effects into adulthood (51, 52, 64). While comparative effectiveness research in national health care reforms is emphasized in the Patient Protection and Affordable Care Act of 2009, applications to prevention programs for young people from birth to high school would advance knowledge on enhancing the cost-effectiveness of services that annually exceed \$600 billion (90). For example, the estimated cost-effectiveness of the CPC program is high (51, 52) as are other early childhood interventions (61, 91). However, many new and promising approaches have not been fully investigated and the organization of program investments across ages to promote better synergy in effectiveness and cost-effectiveness is in the early stages.

3. References

1. A. J. Reynolds, A Structural Model of 1st-Grade Outcomes for an Urban, Low Socioeconomic-Status, Minority Population. *J Educ Psychol* **81**, 594 (1989).
2. A. J. Reynolds, Educational success in high-risk settings: Contributions of the Chicago Longitudinal Study. *J School Psychol* **37**, 345 (1999).
3. Chicago Longitudinal Study, "Chicago Longitudinal Study: User's guide" (University of Minnesota, Institute of Child Development, Minneapolis, 2005).
4. A. J. Reynolds, S. Ou, Early childhood to young adulthood: An introduction to the special issue. *Child Youth Serv Rev* **32**, 1045 (2010).
5. A. J. Reynolds, *Success in early intervention : the Chicago child parent centers*. Child, youth, and family services. (University of Nebraska Press, Lincoln, Neb., 2000), pp. xxviii, 261 p.
6. A. J. Reynolds, J. A. Temple, B. A. White, S. Ou, D. L. Robertson, Age 26 Cost-Benefit Analysis of the Child-Parent Center Early Education Program. *Child Dev* **82**, 379 (2011).
7. A. J. Reynolds, N. Bezruczko, School adjustment of children at risk through fourth grade. *Merrill-Palmer Quarterly: Journal of Developmental Psychology* **39**, 457 (1993).
8. A. J. Reynolds, Effects of a Preschool Plus Follow-on Intervention for Children at Risk. *Dev Psychol* **30**, 787 (1994).
9. J. A. Temple, A. J. Reynolds, School mobility and achievement: Longitudinal findings from an urban cohort. *J School Psychol* **37**, 355 (1999).
10. E. A. Mann, A. J. Reynolds, Early intervention and juvenile delinquency prevention: Evidence from the Chicago Longitudinal Study. *Soc Work Res* **30**, 153 (2006).
11. A. J. Reynolds *et al.*, Effects of a school-based early childhood intervention on adult health and well-being: A 19-year follow-up of low-income families. *Arch Pediat Adol Med* **161**, 730 (2007).
12. S. Ou, A. J. Reynolds, Predictors of educational attainment in the Chicago Longitudinal Study. *School Psychol Quart* **23**, 199 (2008).
13. J. Topitzes, O. Godes, J. P. Mersky, S. Ceglarek, A. J. Reynolds, Educational Success and Adult Health: Findings from the Chicago Longitudinal Study. *Prev Sci* **10**, 175 (2009).
14. F. A. Campbell, C. T. Ramey, E. Pungello, J. Sparling, S. Miller-Johnson, Early childhood education: Young adult outcomes from the Abecedarian Project. *Applied Developmental Science* **6**, 42 (2002).
15. A. J. Reynolds, J. A. Temple, D. L. Robertson, E. A. Mann, Long-term effects of an early childhood intervention on educational achievement and juvenile arrest - A 15-year follow-up of low-income children in public schools. *Jama-J Am Med Assoc* **285**, 2339 (2001).
16. S. L. Ramey *et al.*, "Head Start children's entry into public school: A report on the National Head Start/Public School Early Childhood Transition Demonstration Study: Executive summary" (2000).
17. A. J. Reynolds, J. A. Temple, Quasi-experimental estimates of the effects of a preschool Intervention: Psychometric and econometric comparisons. *Evaluation Rev* **19**, 347 (1995).
18. A. J. Reynolds, Confirmatory program evaluation: Applications to early childhood interventions. *Teachers College Record* **107**, 2401 (2005).
19. A. J. Reynolds, S. Ou, J. W. Topitzes, Paths of effects of early childhood intervention on educational attainment and delinquency: a confirmatory analysis of the Chicago Child-

- Parent Centers. *Child Dev* **75**, 1299 (2004).
20. A. J. Reynolds, J. A. Temple, Extended early childhood intervention and school achievement: Age thirteen findings from the Chicago Longitudinal Study. *Child Dev* **69**, 231 (1998).
 21. P. Cummings, Propensity scores. *Arch Pediatr Adolesc Med* **162**, 734 (2008).
 22. G. W. Imbens, J. M. Wooldridge, Recent developments in the econometrics of program evaluation. *Journal of Economic Literature* **47**, 5 (2009).
 23. A. J. Reynolds, J. A. Temple, D. L. Robertson, E. A. Mann, Age 21 cost-benefit analysis of the Title I Chicago Child-Parent Centers. *Educational Evaluation and Policy Analysis* **24**, 267 (2002).
 24. L. M. Sullivan, *Let us not underestimate the children*. (Scott Foreman & Co., Glenview, IL, 1971).
 25. W. T. Miedel, A. J. Reynolds, Parent Involvement in Early Intervention for Disadvantaged Children: Does It Matter? *J School Psychol* **37**, 379 (1999).
 26. U.S. General Accounting Office, "Education and care: Early childhood programs and services for low-income families" (Washington, DC, 1999).
 27. S. Ou, Pathways of long-term effects of an early intervention program on educational attainment: Findings from the Chicago longitudinal study. *J Appl Dev Psychol* **26**, 578 (2005).
 28. A. J. Reynolds, S. Ou, Paths of Effects From Preschool to Adult Well-Being: A Confirmatory Analysis of the Child-Parent Center Program. *Child Dev* **82**, 555 (2011).
 29. M. E. Lachman, K. M. Firth, in *How healthy are we? A national study of well-being in midlife*, O. G. Brim, C. D. Ryff, R. C. Kessler, Eds. (University of Chicago Press, Chicago, IL, 2004), pp. 320-349.
 30. M. G. Marmot, R. Fuhrer, in *How healthy are we? A national study of well-being at midlife*, O. G. Brim, C. D. Ryff, R. C. Kessler, Eds. (University of Chicago Press, Chicago, IL, 2004), pp. 64-89.
 31. Illinois Shared Enrollment and Graduation Information Consortium. (Southern Illinois University, Carbondale, IL, 2007).
 32. J. Davis, T. Smith, R. Hodge, K. Nakao, J. Treas, "Occupational prestige ratings from the 1989 General Survey" (Inter-university Consortium for Political and Social Research, Ann Arbor, MI, 1991).
 33. W. Barratt, "The Barratt simplified measure of social status (BSMSS): Measuring SES" (Department of Educational Leadership, Administration, and Foundations, Indiana State University, Terre Haute, IN, 2005).
 34. A. B. Hollingshead. (Yale University, New Haven, CT, 1957).
 35. A. B. Hollingshead. (Yale University, New Haven, CT, 1975).
 36. Chapin Hall Center for Children. (University of Chicago, Chicago, IL, 2008).
 37. I. Arteaga, C. Chen, A. J. Reynolds, Childhood predictors of adult substance abuse. *Child Youth Serv Rev* **32**, 1108 (2010).
 38. StataCorp LP., *Stata user's guide : release 11*. (StataCorp LP, College Station, Tex., 2009), pp. x, 396 p.
 39. K. Hirano, G. W. Imbens, G. Ridder, Efficient estimation of average treatment effects using the estimated propensity score. *Econometrica* **71**, 1161 (2003).
 40. T. Kurth *et al.*, Results of multivariable logistic regression, propensity matching, propensity adjustment, and propensity-based weighting under conditions of nonuniform effect. *Am J Epidemiol* **163**, 262 (2006).
 41. J. M. Robins, M. A. Hernan, B. Brumback, Marginal structural models and causal

- inference in epidemiology. *Epidemiology* **11**, 550 (2000).
42. M. Caliendo, S. Kopeinig, Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys* **22**, 31 (2008).
 43. I. Arteaga, University of Minnesota (2010).
 44. J. M. Robins, A. Rotnitzky, Semiparametric Efficiency in Multivariate Regression Models with Missing Data. *Journal of the American Statistical Association* **90**, 122 (1995).
 45. R. J. Sampson, P. Sharkey, S. W. Raudenbush, Durable effects of concentrated disadvantage on verbal ability among African-American children. *P Natl Acad Sci USA* **105**, 845 (2008).
 46. Q. Li, J. S. Racine, J. M. Wooldridge, Estimating Average Treatment Effects with Continuous and Discrete Covariates: The Case of Swan-Ganz Catheterization. *The American Economic Review* **98**, 357 (2008).
 47. J. A. Temple, I. Arteaga, A. J. Reynolds, “Longer-term effects of preschool for urban children: Results from the Chicago Longitudinal Study” (Minneapolis, MN, 2010).
 48. J. M. Robins, A. Rotnitzky, L. P. Zhao, Analysis of Semiparametric Regression-Models for Repeated Outcomes in the Presence of Missing Data. *Journal of the American Statistical Association* **90**, 106 (1995).
 49. D. O. Scharfstein, A. Rotnitzky, J. M. Robins, Adjusting for nonignorable drop-out using semiparametric nonresponse models. *Journal of the American Statistical Association* **94**, 1096 (1999).
 50. L. A. Karoly, M. R. Kilburn, J. S. Cannon, *Early childhood interventions: proven results, future promise*. (RAND Corporation, Santa Monica, CA, 2005).
 51. A. J. Reynolds, J. A. Temple, Cost-effective early childhood development programs from preschool to third grade. *Annu Rev Clin Psycho* **4**, 109 (2008).
 52. J. A. Temple, A. J. Reynolds, Benefits and costs of investments in preschool education: Evidence from the Child-Parent Centers and related programs. *Economics of Education Review* **26**, 126 (2007).
 53. L. J. Schweinhart, *Lifetime effects : the High/Scope Perry preschool study through age 40*. (High/Scope Press, Ypsilanti, Mich., 2005), pp. xvii, 239 p.
 54. K. Burger, How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds. *Early Child Res Q* **25**, 140 (2010).
 55. G. Camilli, S. Vargas, S. Ryan, W. S. Barnett, Meta-Analysis of the Effects of Early Education Interventions on Cognitive and Social Development. *Teachers College Record* **112**, 579 (2010).
 56. M. Manning, R. Homel, C. Smith, A meta-analysis of the effects of early developmental prevention programs in at-risk populations on non-health outcomes in adolescence. *Child Youth Serv Rev* **32**, 506 (2010).
 57. E. C. Melhuish *et al.*, Preschool Influences on Mathematics Achievement. *Science* **321**, 1161 (2008).
 58. W. T. Gormley, D. Phillips, T. Gayer, Preschool Programs Can Boost School Readiness. *Science* **320**, 1723 (2008).
 59. Administration for Children and Families, “Research to practice: Preliminary findings from the Early Head Start Prekindergarten followup” (U.S. Department of Health and Human Services, Washington, DC, 2006).
 60. Administration for Children and Families, “Head Start Impact Study. Final Report.” (U.S. Department of Health and Human Services, Washington, DC, 2010).

61. A. J. Reynolds, A. J. Rolnick, M. M. Englund, J. A. Temple, Eds., *Childhood programs and practices in the first decade of life : a human capital integration*, (Cambridge University Press, New York, 2010), pp. xxiii, 518 p.
62. R. B. McCall, L. Larsen, A. Ingram, in *Early childhood programs for a new century*, A. J. Reynolds, M. C. Wang, H. J. Walberg, Eds. (CWLA Press, Washington, DC, 2003), pp. 255-298.
63. G. J. August, A. Gewirtz, G. M. Realmuto, Moving the field of prevention from science to service: Integrating evidence-based preventive interventions into community practice through adapted and adaptive models. *Applied and Preventive Psychology*, **In Press**.
64. M. Nation *et al.*, What works in prevention - Principles of effective prevention programs. *Am Psychol* **58**, 449 (2003).
65. M. C. McCormick *et al.*, Early intervention in low birth weight premature infants: Results at 18 years of age for the infant health and development program. *Pediatrics* **117**, 771 (2006).
66. D. L. Johnson, J. Blumenthal, The Parent Child Development Centers and School Achievement: A Follow-Up. *The Journal of Primary Prevention* **25**, 195 (2004).
67. J. R. Lally, P. L. Mangione, A. S. Honig, D. S. Wittner, More pride, less delinquency: Findings from the ten-year follow-up study of the Syracuse Family Development Research Program. *Zero to Three* **8**, 13 (1988).
68. R. Chazan-Cohen *et al.*, It takes time: Impacts of early head start that lead to reductions in maternal depression two years later. *Infant Ment Health J* **28**, 151 (2007).
69. Consortium for Longitudinal Studies., *As the twig is bent--lasting effects of preschool programs*. (L. Erlbaum Associates, Hillsdale, N.J., 1983), pp. xiii, 494 p.
70. O. G. Brim, C. D. Ryff, R. C. Kessler, *How healthy are we? A national study of well-being in midlife*. O. G. Brim, C. D. Ryff, R. C. Kessler, Eds., (University of Chicago Press., Chicago, IL, 2004).
71. A. E. Barrett, Socioeconomic status and age identity: the role of dimensions of health in the subjective construction of age. *J Gerontol B Psychol Sci Soc Sci* **58**, S101 (2003).
72. M. Cohen, The monetary value of saving a high-risk youth. *Journal of Quantitative Criminology* **14**, 5 (1998).
73. M. A. Cohen, "The costs of crime and justice." (Routledge, New York, NY, 2005).
74. J. C. Day, E. C. Newburger, "The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings. Special Studies. Current Population Reports" (2002).
75. M. E. O'Connell, T. Boat, K. E. Warner, *Preventing mental, emotional and behavioral disorders among young people: Progress and possibilities.*, (National Academies Press, Washington, DC, 2009).
76. P. Braveman, C. Barclay, Health disparities beginning in childhood: a life-course perspective. *Pediatrics* **124 Suppl 3**, S163 (2009).
77. C. R. Belfield, H. M. Levin, Eds., *The price we pay: Economic and social consequences of inadequate education*, (Brookings, Washington, DC, 2007).
78. M. Ver Ploeg, E. Perrin, Eds., *Eliminating health disparities: Measurement and data needs.*, (National Academies Press, Washington, DC, 2004).
79. W. J. Wilson, *More than just race: Being black and poor in the inner city.*, (W. W. Norton & Company, Inc, New York, NY, 2009).
80. U. S. Department of Health and Human Services, "Healthy people in healthy communities: A community planning guide using Healthy People 2010." (Office of Disease Prevention and Health Promotion, Washington, DC, 2001).
81. U. S. Department of Health and Human Services, "Healthy People 2020: An Opportunity

- to Address Societal Determinants of Health in the U.S. ” (Secretary's advisory committee on national health promotion and disease prevention objectives for 2020, Washington, DC, 2010).
82. B. Guyer *et al.*, Early childhood health promotion and its life course health consequences. *Acad Pediatr* **9**, 142 (2009).
 83. J. D. Finn, S. B. Gerber, J. Boyd-Zaharias, Small classes in the early grades, academic achievement, and graduating from high school. *J Educ Psychol* **97**, 214 (2005).
 84. J. J. Heckman, J. Stixrud, S. Urzua, The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. *Journal of Labor Economics* **24**, 411 (2006).
 85. S. Aos, M. Miller, J. Mayfield, “Benefits and costs of K-12 education policies: Evidence-based effects of class size reductions and full-day kindergarten.” (Washington State Institute for Public Policy, Olympia, WA, 2007).
 86. J. D. Hawkins, R. F. Catalano, R. Kosterman, R. Abbott, K. G. Hill, Preventing adolescent health-risk behaviors by strengthening protection during childhood. *Arch Pediatr Adolesc Med* **153**, 226 (1999).
 87. J. D. Hawkins, R. Kosterman, R. F. Catalano, K. G. Hill, R. D. Abbott, Effects of social development intervention in childhood 15 years later. *Arch Pediatr Adolesc Med* **162**, 1133 (2008).
 88. A. J. Reynolds, L. C. Mathieson, J. W. Topitzes, Do Early Childhood Interventions Prevent Child Maltreatment? A Review of Research. *Child Maltreatment* **14**, 182 (2009).
 89. A. J. Reynolds, One-Year of Preschool Intervention or 2 - Does It Matter. *Early Child Res Q* **10**, 1 (1995).
 90. National Science and Technology Council, “Investing in our future: A national research initiative for America's children for the 21st century” (Executive Office of the President, Office of Science and Technology Policy, Committee on Fundamental Science, and the Committee on Health, Safety, and Food, Washington, DC, 1997).
 91. A. Rolnick, R. Grunewald, “Early childhood development: economic development with a high public return. ” (Federal Reserve Bank of Minneapolis, 2003).
 92. M. Huber. Identification of average treatment effects in social experiments under different forms of attrition. *Journal of Educational and Behavioral Statistics*, **In Press**.

4. Supplementary Tables

Table S1a. Patterns of Participation of Original Intervention and Comparison Groups in the CLS

Study category	Total Sample	Preschool Intervention Group*	Comparison Group*
Program Participants' Characteristics at Start of Study**			
Original Sample	1539	989	550
No. of cases with preschool participation	1073	989	84
No. of cases with CPC preschool	989	989	0
Years in CPC preschool (0-2)	0.99	1.55	0.0
No. of cases with Head Start preschool	85	1	84
No. of cases with kindergarten participation	1539	989	550
No. of cases with CPC participation	989	989	0
Full-day kindergarten, %	--	59.9	100.0
No. of cases with CPC school-age participation	850	684	166
Years of school-age program (0-3)	1.16	1.43	0.68
School-age participation, %	--	69.2	30.2
No. of cases with CPC extended intervention (4-6 y)	553	553	0
Extended participation, %	--	55.9	0.0
Total years of CPC program (0-6)	2.78	3.95	0.68
No. of cases with no CPC participation	384	0	384
No. of Lost cases in Post-program Years			
Moved***			
From ages 6-10 y	69	41	28
After age 10 y	52	30	22
Deceased	50	33	17
Follow-up Study Characteristics of Participants by Age 28, No. of cases with data			
Educational attainment/employment	1386	900	486
Public aid	1335	868	467
Crime and justice system involvement	1473	950	523
Socioeconomic status	1265	821	444
Health insurance	1304	850	454
Family status	1233	808	425
One or more outcomes	1486	957	529
Two or more outcomes	1458	939	519
Three or more outcomes	1400	909	491

*Cases for program participation cover the 6-year period (1983-1989) that defines enrollment in the CPC intervention.

**The CPC preschool comparison group participated in a full-day kindergarten program, and 84 participated in Head Start preschool. 109 parents in the comparison group reported their child participated in other child care/education in preschool. 176 cases in the comparison group were eligible to receive limited services in the CPC kindergarten but enrolled in different classrooms. They are not part of the original CPC intervention group. Some cases in the comparison group participated in the school-age program because it was open to any child enrolled in elementary school from first to third grade. Fifteen children in the CPC intervention group enrolled in the alternative full-day kindergarten.

***These categories account for attrition from the original study sample of 1,539. Cases were lost during post-program years because they moved from Chicago and could not be located, were deceased, or either did not have sufficient identifying information to track, refused to participate or were incarcerated (other). At age 28, the total number of deceased cases in the study was 50. The attrition sample (cases lost in post-program years) of 153 had missing data on educational attainment and employment between ages 24 and 27.

Table S1b. Patterns of Participation of School-Age and Extended Intervention Groups in the CLS

Study category	Total Sample	School-age Intervention Group*	Comparison Group*	Total Sample	Extended Intervention Group	Prek+K comparison Group
Program Participants' Characteristics at Start of Study**						
Original Sample	1234	850	384	989	553	436
No. of cases with preschool participation	877	731	146	989	553	436
No. of cases with CPC preschool	684	684	0	989	553	436
Years in CPC preschool (0-2)	0.86	1.25	0	1.54	1.56	1.52
No. of cases with Head Start preschool	85	5	80	1	1	0
No. of cases with kindergarten participation	1234	850	384	989	553	436
No. of cases with CPC participation	684	684	0	989	553	436
Full-day kindergarten, %	76.4	65.8	100	59.9	56.8	63.8
No. of cases with CPC school-age participation	850	850	0	684	553	131
Years of school-age program (0-3)	1.45	2.10	0	1.43	2.31	0.31
School-age participation, %	68.9	100	0	69.2	100	30
No. of cases with CPC extended intervention (4-6 y)	553	553	0	553	553	0
Extended participation, %	--	65.1	0	--	100	0
Total years of CPC program (0-6)	2.85	4.14	0	3.95	4.86	2.80
No. of cases with no CPC participation	384	0	384	0	0	0
No. of Deceased cases						
Deceased	40	29	11	33	14	19
Follow-up Study Characteristics of Participants by Age 28, No. of cases with data						
Educational attainment/employment	1111	774	337	898	515	383
Public aid	1085	755	330	868	513	355
Crime and justice system involvement	1189	826	363	950	543	407
Socioeconomic status	1020	709	311	821	471	350
Health insurance	1047	727	320	850	488	362
Family status	985	687	298	808	462	346

Table S1b. Patterns of Participation of School-Age and Extended Intervention Groups in the CLS (Continued)

Study category	Total Sample	School-age Intervention Group*	Comparison Group*	Total Sample	Extended Intervention Group	Prek+K comparison Group
One or more outcomes	1199	831	368	957	545	412
Two or more outcomes	1176	815	361	939	540	399
Three or more outcomes	1130	788	342	909	528	381

*Cases for program participation cover the 6-year period (1983-1989) that defines enrollment in the CPC intervention. The comparison group did not participate in any CPC intervention. The 305 cases with preschool participation but no school-age participation are excluded for the school-age comparison group. Because extended intervention required preschool participation, the original sample size for the extended group is 989. The Prek+K comparison group did not participate in school-age intervention.

**The CPC school-age comparison group participated in a full-day kindergarten program, and 80 participated in Head Start preschool. 66 parents in the comparison group reported their child participated in other child care/education in preschool. 42 parents in the school-age intervention group reported their child participated in other child care/education in preschool, and 66 parents in the comparison group reported their child participated in other child care/education in preschool.

***These categories account for attrition from the original study sample of 1,539. Cases were lost during post-program years because they moved from Chicago and could not be located, were deceased, or either did not have sufficient identifying information to track, refused to participate or were incarcerated (other). At age 28, the total number of deceased cases in the study was 50. The attrition sample (cases lost in post-program years) of 153 had missing data on educational attainment and employment between ages 24 and 27.

Table S2a. Equivalence of CPC Preschool Intervention and Comparison Groups on Preprogram Attributes for the Age 28 Follow-up Study (N=1,386)

Child/Family Characteristics**	Age 28 Follow-up Sample*			Male	Original	With
	Preschool Intervention Group (N=900)	Comp. Group (N=486)	P value	Only P value	Sample (n = 1539 P value	covariates P value
Sample recovery, %	91.0	88.4	--	.650	.109	--
Adult administrative records, %	92.7	93.8	.440	.126	.933	.557
African American child, %	93.3	93.0	.823	.359	1.00	.257
Female child, %	53.9	47.7	.032	--	.109	.085
Low birth weight (<2500g), %	11.7	14.5	.141	.697	.134	.323
Home environment problems ages 0-5	0.19	0.14	.124	.070	.118	.088
Complication of pregnancy or with labor, %	11.2	10.5	.719	.297	.439	.637
Reside in high poverty school area, % ^{xz}	77.8	73.0	.055	.318	.040	.109
Reside in high poverty neighborhood, %	59.3	40.1	.000	.000	.000	.000
Child welfare case histories by age 4, %	3.1	5.2	.068	.122	.069	.085
Mother under age 18 at child birth, % ^x	16.4	18.4	.364	.213	.695	.541
Mother completed high school, % ^x	49.4	41.2	.004	.167	.001	.018
Mother had some college at child birth, %	13.8	10.9	.124	.469	.072	.048
Father completed high school at birth, %	62.5	59.7	.468	.405	.317	.972
Father had some college at child birth, %	20.0	15.3	.154	.400	.145	.165
Single parent family status, % ^x	76.3	74.8	.593	.451	.613	.958
Mother not employed, % ^x	64.7	59.4	.073	1.00	.123	.120
Child eligible for subsidized meals, % ^{xy}	83.2	82.3	.703	.836	.384	.982
Participate in AFDC program, % ^x	62.5	60.3	.441	.616	.609	.685
Four or more children in family, % ^x	16.5	19.4	.201	.743	.281	.353
Missing 1 or more risk factors, %	12.7	15.6	.141	.104	.035	.422
Risk index (0 to 8), mean (SD)	4.51 (1.66)	4.50 (1.77)	.960	.338	.802	.578

*The age 28 follow-up sample had known educational attainment by August 2008 or employment from 2004 to 2007. P values show the significance of mean (or percentage) group differences for age the 28 sample. The preschool comparison group participated in an alternative full-day kindergarten but had no CPC preschool participation.

**Data on child and family characteristics were collected from birth to age 3 based on multiple administrative records and parent surveys. Data on AFDC (Aid to Families with Dependent Children) and subsidized school meals were collected up to age 8. Home environment problems considered were retrospective reports of frequent family conflict, substance abuse of parent, and family financial problems between ages 0-5. The measure ranges from 0 to 3. Sample sizes ranged from 1241 to 1386 (follow-up sample). The sample size for father's education is 709. They ranged from 1342 to 1539 for the original sample (not shown). X: Variable included in the risk index. Y: Eligibility defined at <130% of the federal poverty level. Z: High poverty is defined as residence in a school area in which 60% or more children live in families with low income.

Table S2b. Equivalence of CPC School-age Intervention and Comparison Groups on Pre-program Attributes for the Age 28 Follow-up Study (N=1,386)

Child/Family Characteristics**	Age 28 Follow-up Sample*			Original Sample (n = 1539) <i>P</i> value	With covariates <i>P</i> Value
	School-age Intervention Group (N=776)	Comp. Group (N=610)	<i>P</i> value		
Sample recovery, %	91.3	88.5	--	.086	--
Adult administrative records, %	93.4	92.6	.595	.042	.157
African American child, %	93.9	92.3	.238	.368	.720
Female child, %	52.5	50.8	.552	.719	.987
Low birth weight (<2500g), %	12.9	12.3	.803	.873	.926
Home environment problems ages 0-5	0.19	0.15	.140	.137	.166
Complication of pregnancy or with labor, %	10.3	11.8	.388	.508	.383
Reside in high poverty school area, % ^{xz}	75.6	76.7	.657	.590	.690
Reside in high poverty neighborhood, %	56.4	47.9	.002	.001	.009
Child welfare case histories by age 4, %	3.8	3.8	1.00	1.00	.461
Mother under age 18 at child birth, % ^x	17.5	16.7	.717	1.00	.139
Mother completed high school, % ^x	48.8	43.7	.061	.093	.021
Mother had some college at child birth, %	13.8	11.5	.218	.157	.084
Father completed high school at birth, %	60.8	62.4	.698	.941	.834
Father had some college at child birth, %	18.2	18.5	.923	.853	.489
Single parent family status, % ^x	76.6	74.8	.481	.808	.253
Mother not employed, % ^x	64.3	60.9	.235	.457	.960
Child eligible for subsidized meals, % ^{xy}	83.3	82.3	.660	.673	.902
Participate in AFDC program, % ^x	63.6	59.3	.123	.227	.473
Four or more children in family, % ^x	16.6	18.8	.312	.678	.437
Missing 1 or more risk factors, %	11.6	16.4	.012	.000	.933
Risk index (0 to 8), mean (SD)	4.54 (1.66)	4.50 (1.75)	.864	.623	.127

*The age 28 follow-up sample had known educational attainment by August 2008 or employment from 2004 to 2007. *P* values show the significance of mean (or percentage) group differences for age 28 sample.

**Data on child and family characteristics were collected from birth to age 3 based on multiple administrative records and parent surveys. Data on AFDC (Aid to Families with Dependent Children) and subsidized meals were collected up to age 8. Home environment problems considered were retrospective reports of frequent family conflict, substance abuse of parent, and family financial problems between ages 0-5. The measure ranges from 0 to 3. Sample sizes ranged from 1241 to 1386 (follow-up sample). The sample size for father's education is 709. They ranged from 1342 to 1539 for the original sample (not shown). X: Variable included in the risk index. Y: Eligibility defined at <130% of the federal poverty level. Z: High poverty is defined as residence in a school area in which 60% or more children live in families with low income.

Table S2c. Equivalence of CPC Extended Intervention and Comparison Groups on Preprogram Attributes for the Age 28 Follow-up Study (N=1,386)

Child/Family Characteristics**	Age 28 Follow-up Sample*			Original	With
	Extended Intervention Group (N=516)	Less Extended Group (N=870)	P value	Sample (n = 1539) P value	covariates P value
Sample recovery, %	93.3	88.2	--	.001	--
Adult administrative records, %	94.8	92.1	.063	.000	.973
African American child, %	93.8	92.9	.580	1.00	.449
Female child, %	55.0	49.8	.059	.079	.344
Low birth weight (<2500g), %	11.3	13.5	.268	.364	.509
Home environment problems ages 0-5	0.19	0.16	.398	.409	.375
Complication of pregnancy or with labor, %	10.5	11.3	.722	.864	.724
Reside in high poverty school area, % ^{xz}	76.9	75.6	.603	.576	.541
Reside in high poverty neighborhood, %	56.5	50.3	.031	.019	.035
Child welfare case histories by age 4, %	2.8	4.5	.138	.053	.279
Mother under age 18 at child birth, % ^x	15.8	18.0	.333	.171	.872
Mother completed high school, % ^x	51.6	43.5	.005	.002	.014
Mother had some college at child birth, %	15.7	11.1	.014	.004	.032
Father completed high school at birth, %	64.3	59.9	.262	.145	.847
Father had some college at child birth, %	19.8	17.5	.481	.385	.618
Single parent family status, % ^x	76.7	75.2	.554	.900	.996
Mother not employed, % ^x	63.5	62.5	.718	.908	.990
Child eligible for subsidized meals, % ^{xy}	82.7	82.9	.941	1.00	.967
Participate in AFDC program, % ^x	62.7	61.2	.602	.780	.646
Four or more children in family, % ^x	16.5	18.2	.460	.830	.944
Missing 1 or more risk factors, %	9.5	16.2	.000	.000	.462
Risk index (0 to 8), mean (SD)	4.46 (1.68)	4.54 (1.72)	.383	.133	.605

*The age 28 follow-up sample had known educational attainment by August 2008 or employment from 2004 to 2007. P values show the significance of mean (or percentage) group differences for the age 28 sample. The extended intervention group had 4 to 6 years of CPC services from preschool to second or third grade. The less extended intervention group had 0 to 4 years. This contrast defines extended intervention-1.

**Data on child and family characteristics were collected from birth to age 3 based on multiple administrative records and parent surveys. Data on AFDC (Aid to Families with Dependent Children) and subsidized school meals were collected up to age 8. Home environment problems considered were retrospective reports of frequent family conflict, substance abuse of parent, and family financial problems between ages 0-5. The measure ranges from 0 to 3. Sample sizes ranged from 1241 to 1386 (follow-up sample). The sample size for father's education is 709. They ranged from 1342 to 1539 for the original sample (not shown). X: Variable included in the risk index. Y: Eligibility defined at <130% of the federal poverty level. Z: High poverty is defined as residence in a school area in which 60% or more children live in families with low income.

Table S3. Data Sources of Adult Outcomes by Age 28

Adult outcomes	Data collected or obtained by:	Average age on this date	Data source
<i>Educational attainment</i>	August 31, 2008	28.3	Survey ¹ /Adm ²
<i>Socioeconomic status</i>			
Occupational prestige	December 31, 2004	24.6	Survey ¹ /Adm ³
SES and income	December 31, 2007	27.6	Survey ¹ /Adm ³
Public aid	December 31, 2007	27.6	Adm ⁴
<i>Health status and behavior</i>			
Insurance	December 31, 2007	27.6	Survey ¹ /Adm ^{2 4 5}
Substance abuse	December 31, 2007	27.6	Survey ¹ /Adm ^{5 6}
<i>Crime</i>	December 31, 2006	26.6	Survey ¹ /Adm ^{5 7}
<i>Family status</i>	December 31, 2007	27.6	Survey ¹ /Adm ⁴

Note. The measures for educational attainment, justice system involvement, and family status were assessed at similar ages and thus are not shown.

1. Survey = CLS age 22/24 survey questionnaire.

2. Illinois Shared Enrollment and Graduation (ISEG) Consortium.

3. Illinois Department of Employment Security (IDES).

4. Illinois Public Assistance Data Base, Illinois Department of Health and Human Services, maintained at Chapin Hall Center for Children at the University of Chicago.

5. Cook County Circuit Court, Illinois.

6. Department of Motor Vehicles, Illinois.

7. State-level arrest data were obtained through manual online record searches of the Illinois Department of Corrections, the Wisconsin Circuit Court, the Iowa Courts, the Minnesota Department of Public Safety and the Minnesota Bureau of Criminal Apprehension primarily, as well as the Department of Corrections system from 15 other states. Federal-level records were collected from manual online record searches of The Federal Bureau of Prisons.

Table S4. Chicago Longitudinal Study Occupational Prestige Scale

Code	Occupational Title	BSMSS Occupational Status Scores	Nakao-Treas Occupational Prestige Score
1	Dish washer or bus boy, car wash attendant or detailer, usher at a movie theater, chambermaid, parking lot attendant, garage or service station related occupations (e.g., lube technician, cashier, filler), janitor, telephone solicitor (e.g., telemarketer, telephone sales rep), housekeeper or homemaker at nursing home or temporary in-home care provider, supermarket clerk, stock handler or grocery bagger, fast food counter sales, cook or prep worker, driver-sales worker (e.g., pizza delivery driver), temporary or day laborer (e.g., mover, garbage sorter, non-machine operating packer).	5	0 - 23.99 Low
2	Bill or account collector, bartender, packing and filling machine operator, amusement or recreation facilities attendant, machinery maintenance occupations, loader, driver helper, package handler or sorter, baggage porter or ramp agent, stock or inventory clerk, shoe sales person, automotive parts sales person, garbage collector, price marker in a retail store, waiter, short-order cook, cab driver or chauffeur, light truck driver, assembly line worker, groundskeeper or gardener, carpenter apprentice or helper, building rehabilitation worker, private household child care worker (i.e. babysitter), private household unlicensed hairdresser or barber, salon assistant, library clerk, cashier at a supermarket or equivalent location (e.g., Target, Wal-Mart, Home Depot, Menards, Lowes, Walgreens).	10	24 - 29.99
3	Heavy truck driver, bus driver, mail clerk or carrier for a private company (e.g., UPS), dispatcher, car rental agent, ticket agent at an airport, retail and apparel sales person, car sales person, cook in a restaurant, baker, delicatessen, hotel clerk or front desk attendant, sales counter or general office clerk, clerical assistant, office communications or copy machine operator, photo both operator, shipping and receiving clerk, construction or maintenance worker, mechanic apprentice or helper, meter reader, machine operator (e.g., forklift operator), production inspector, checker or examiner, barber, supervisor for food preparation or service occupations (e.g., fast food restaurant manager, janitorial engineer), tutor, child care worker or day care aide, except private household, un-certified nursing home aide or attendant.	15	30 - 35.99
4	Professional hairdresser or cosmetologist, skilled construction laborer, carpenter, automobile mechanic, electrician apprentice or helper, optical goods worker (e.g., lens grinder, lab tech), security guard, recreational worker (e.g., camp counselor, resident counselor, leader, lifeguard), student worker or intern (e.g. research assistant, teacher assistant), receptionist, loan processor, data entry clerk, customer service representative, advertising sales, production coordinator, facilities, hospital attendant, child care supervisor.	20	36 - 41.99
5	Heating, air conditioning and refrigerator repair, not specified skilled mechanic or repairer, personnel training and labor relations specialist, dental assistant, administrative or executive assistant, professional secretary, bookkeeper or accounts receivable clerk, supervisor for sales and service occupations, bank teller, newspaper proofreader, religious worker, insurance sales person or broker, designer (e.g., interior decorator), musician, instructor (e.g., dance, computers) elementary school teacher aide, substitute teacher, mail carrier for US postal services, welfare services aide, certified nursing assistant.	25	42 - 47.99 Moderate
6	Technician (e.g., engineers assistant, pharmacy technician), financial officer (e.g., credit manager, income tax preparer, personal financial planner, underwriter), office manager (e.g., supervisor of telephone exchange branch), administrator (e.g., general manger or owner of a moving and storage company, fast food franchise, day care center), real estate agent, health diagnosing practitioner, hospital admissions officer, electrician, computer repairer, social worker, securities and financial services occupations, air craft mechanic, professionally trained librarian, disc jockey, pre-kindergarten or nursery school teacher, military enlisted personnel.	30	48 - 54.99
7	Legal assistant, counselor, health technologist or technician (e.g., x-ray technician), electrical technician, financial manager (e.g., bank manager), marketing, advertising or public relations manager, licensed practical nurse, police personnel, physical, occupational or speech therapist, computer programmer.	35	55 - 60.99
8	Veterinarian, nuclear, mechanical or electrical engineer, professional accountant, educational administrator (e.g., college admissions officer, school principal), professional athlete, registered nurse, military officer, elementary, secondary or special education teacher.	40	61 - 66.99
9	Pharmacist, psychologist, chief executive, judge, aerospace or chemical engineer, professor, lawyer, physician, public official.	45	67 - 100 High

Table S5. Descriptive Statistics for Study Measures

Measures	N	Min.	Max.	Mean	SD
CPC program					
Preschool	1539	0	1	0.64	0.48
School-age	1539	0	1	0.55	0.50
Extended-1 (4-6 years versus fewer)	1539	0	1	0.36	0.48
Extended-2 (4-6 years versus 1-3 years)	989	0	1	0.56	0.50
Covariates¹					
African American child	1539	0	1	0.93	0.26
Female child	1531	0	1	0.50	0.50
Reside in high poverty neighborhood	1538	0	1	0.50	0.50
Child welfare cases histories by age 4	1539	0	1	0.04	0.19
Mother under age 18 at child birth	1539	0	1	0.16	0.37
Mother did not complete high school	1539	0	1	0.54	0.50
Mother not employed	1539	0	1	0.66	0.47
Single parent family status	1539	0	1	0.76	0.42
Child eligible for subsidized meals	1539	0	1	0.83	0.37
Participate in TANF	1539	0	1	0.63	0.48
Four or more children in family	1539	0	1	0.17	0.37
Home environment problems, ages 0-5 ²	1531	0	3	0.15	0.46
Educational Attainment by Age 28					
On time graduation	1421	0	1	0.41	0.49
High school completion	1382	0	1	0.78	0.42
Highest grade completed	1380	3	19	12.06	1.74
College attendance	1382	0	1	0.34	0.48
4-year college attendance	1382	0	1	0.13	0.34
BA or AA degree	1382	0	1	0.08	0.27
Socioeconomic Status					
Occupational prestige composite (1-8) by age 24	1335	1	8	2.71	1.53
Occupational prestige \geq 4 by age 24	1335	0	1	0.28	0.45
SES composite (0-8) ages 24-27	1265	0	8	2.89	2.42
SES \geq 4 ages 24-27	1265	0	1	0.34	0.47
AA or BA or employed 8+ quarters ages 24-27	1388	0	1	0.46	0.50
Average annual income ages 24-27	1231	0	30,000	11,331	9,292
Average annual income 14K or higher	1231	0	1	0.33	0.47
Full-time employment (8 or more quarters)	1052	0	1	0.25	0.43

Table S5. Descriptive Statistics for Study Measures (Continued)

Measures	N	Min.	Max.	Mean	SD
Public Aid					
Ages 18-23					
Any food stamp participation	1335	0	1	0.57	0.50
2 or more years participation in food stamp	1335	0	1	0.27	0.44
Any TANF participation, %	1335	0	1	0.25	0.43
2 or more years participation in TANF	1335	0	1	0.09	0.28
Ages 24-27					
Any food stamp participation	1335	0	1	0.48	0.50
2 or more years participation in food stamp	1335	0	1	0.22	0.42
Any TANF participation	1335	0	1	0.10	0.30
2 or more years participation in TANF	1335	0	1	0.02	0.13
Health Status and Behavior					
Any insurance by age 27	1304	0	1	0.71	0.46
Any public insurance by age 27	1304	0	1	0.29	0.45
Any private insurance by age 27	1304	0	1	0.46	0.50
Substance abuse (excluding alcohol) ages 16-26	1473	0	1	0.21	0.41
Drug and alcohol abuse ages 16-26	1342	0	1	0.24	0.43
Crime and Justice System Involvement by Age 26					
Any adult arrest (include self-report)	1473	0	1	0.50	0.50
Any violent charge	1473	0	1	0.21	0.41
Any conviction	1473	0	1	0.27	0.44
Number of adult arrests	1473	0	31	1.77	3.47
Any felony charge	1473	0	1	0.22	0.41
Number of felony charges	1473	0	7	0.50	1.17
Ever incarcerated or jail (include self-report)	1465	0	1	0.23	0.42
Family Status					
Age at birth of first child	757	11.86	27.15	19.14	2.65
Parenthood by age 27	1233	0	1	0.64	0.48
Number of children by age 27	1233	0	6	1.29	1.31
Had 3 or more children by age 27	1233	0	1	0.19	0.39
If married or living with partner by age 24	1127	0	1	0.25	0.43

Note. 1 Missing data were imputed. The variable “home environment problems” had the most imputed data (25.41% imputed). The variable “mother not employed” had 12.80% of imputed data. Less than 7.00% of data for the other covariates were imputed.

2 Home environment problems considered were retrospective reports of frequent family conflict, substance abuse of parent, and family financial problems between ages 0-5.

Table S6a. Estimates of Sample Recovery for Three Outcomes

Predictors	<u>Crime</u>		<u>SES</u>		<u>Edu att.</u>	
	Coef.	P>z	Coef.	P>z	Coef.	P>z
Constant term	1.996	0.414	-0.076	0.952	1.172	0.420
CPC preschool program participation	-0.085	0.575	0.041	0.609	0.081	0.276
CPC School-age program participation	0.028	0.841	-0.095	0.313	-0.032	0.749
Standardized word test, child age 5	0.001	0.927	-0.001	0.850	0.004	0.407
Mother did not complete HS, child age 0-3	-0.190	0.192	-0.037	0.685	-0.172	0.084
Child eligible for subsidized meals, child age 0-3	0.236	0.338	0.136	0.121	0.169	0.164
Mother under age 18 at child birth	0.345	0.098	0.226	0.078	0.271	0.028
Four or more children in family, child age 0-3	0.420	0.075	0.082	0.414	0.138	0.287
Participate in AFDC program, child age 0-3	-0.224	0.112	-0.108	0.416	-0.229	0.067
Mother not employed, child age 0-3	-0.029	0.835	0.065	0.651	0.025	0.846
Single parent family status, child age 0-3	0.052	0.740	-0.041	0.596	-0.042	0.751
Indicator for missing risk factors, child age 0-3	-0.631	0.000	-0.441	0.001	-0.387	0.001
Reside in high poverty school area	-0.007	0.968	0.005	0.931	-0.075	0.545
Low birth weight (<2500g)	0.233	0.263	0.097	0.361	0.104	0.358
Family conflict, child age 0-5	0.300	0.178	-0.152	0.346	0.356	0.006
Family financial problems, child age 0-5	-0.023	0.927	0.085	0.598	0.184	0.271
Substance abuse parent, child age 0-5	0.273	0.577	-0.116	0.597	-0.086	0.736
Female child	-0.132	0.297	0.302	0.002	0.321	0.002
African American child	-0.020	0.947	0.013	0.926	0.092	0.566
Proxy of residential mobility	0.043	0.585	-0.101	0.060	-0.067	0.337
Have social security number	1.408	0.000	1.059	0.000	0.938	0.000
Census tract neighborhood mobility < 1 year	-0.513	0.861	0.385	0.780	-1.370	0.459
Census tract neighborhood mobility 1-5 years	-2.142	0.429	-0.445	0.759	-0.427	0.797
Census tract neighborhood mobility 5-10 years	-0.882	0.754	0.758	0.569	-0.308	0.865
Census tract neighborhood mobility 10-20 years	-0.902	0.736	0.801	0.591	-0.794	0.631
Census tract self-employed rate	-7.466	0.003	-5.581	0.026	-5.290	0.049
Census tract African American female householder	0.229	0.643	-0.436	0.131	-0.580	0.015

Table S6b. Estimates of Participation in the CPC Program (n=1,531)

Predictors	Preschool		School-age		Extended		No CPC ¹		CPC extension ¹	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Constant term	2.124	0.087	-0.001	0.999	-0.038	0.962	-0.484	0.794	-0.838	0.577
Mother did not complete HS, child age 0-3	-0.288	0.003	-0.168	0.040	-0.256	0.003	-0.019	0.017	0.015	0.062
Child eligible for subsidized meals, child age 0-3	0.048	0.631	-0.026	0.812	-0.032	0.806	0.191	0.063	-0.142	0.165
Mother under age 18 at child birth	-0.056	0.367	0.031	0.795	-0.055	0.621	-0.179	0.201	-0.123	0.544
Four or more children in family, child age 0-3	-0.168	0.069	-0.056	0.570	-0.045	0.588	0.109	0.442	0.042	0.842
Participate in AFDC program, child age 0-3	-0.051	0.550	0.100	0.156	0.110	0.199	0.171	0.359	0.080	0.656
Mother not employed, child age 0-3	0.148	0.111	0.032	0.743	-0.003	0.978	0.117	0.300	0.250	0.036
Single parent family status, child age 0-3	-0.001	0.988	-0.027	0.747	0.010	0.897	-0.294	0.052	-0.160	0.302
Indicator for missing risk factors, child age 0-3	-0.148	0.068	-0.351	0.000	-0.470	0.000	0.081	0.450	0.057	0.594
Reside in high poverty neighborhood	1.679	0.000	0.356	0.415	0.467	0.255	-0.133	0.334	-0.743	0.000
Low birth weight (<2500g)	-0.254	0.002	-0.091	0.486	-0.244	0.029	-2.431	0.000	-0.890	0.135
Child underage at preschool entry	-0.148	0.160	-0.112	0.267	-0.109	0.335	0.217	0.213	-0.111	0.574
Family conflict, child age 0-5	0.020	0.878	0.138	0.213	0.120	0.357	-0.011	0.956	-0.146	0.526
Family financial problems, child age 0-5	-0.002	0.987	-0.044	0.709	-0.285	0.003	0.394	0.108	0.366	0.116
Substance abuse parent, child age 0-5	0.108	0.417	-0.109	0.487	0.196	0.121	-0.040	0.869	-0.419	0.024
Female child	0.104	0.058	-0.002	0.982	0.083	0.283	-0.359	0.129	0.034	0.877
African American child	-0.247	0.686	0.018	0.966	-0.125	0.714	-0.011	0.919	0.036	0.763
Age in months at kindergarten	-0.033	0.028	0.002	0.896	-0.004	0.773	0.207	0.722	-0.125	0.392

Note: 1. Coefficients are from a multinomial probit regression. Base outcome is no CPC extension group.

AFDC = Aid to Families with Dependent Children.

Table S6c. Propensity Scores: Means and Standard Errors of the Mean

Propensity Scores	Mean	S.E.
Prob. CPC preschool participation	0.6454	0.0030
Prob. CPC school age participation	0.5552	0.0017
Prob. CPC extended program participation	0.3612	0.0022
Prob. of being in the education sample	0.9027	0.0023
Prob. of being in the crime sample	0.9620	0.0020
Prob. of being in the SES sample	0.8265	0.0033
Prob. of being in the health insurance sample	0.8515	0.0035
Prob. of being in the TANF sample	0.9021	0.0040
(prob. CPC prek) * (prob. educ. Sample)	0.5843	0.0033
(prob. CPC prek) * (prob. crime. sample)	0.6220	0.0030
(prob. CPC prek) * (prob. SES sample)	0.5354	0.0034
(prob. CPC prek) * (prob. health insurance sample)	0.5523	0.0036
(prob. CPC prek) * (prob. TANF sample)	0.5844	0.0039
(prob. CPC school-age) * (prob. educ. Sample)	0.5041	0.0023
(prob. CPC school-age) * (prob. crime. sample)	0.5366	0.0023
(prob. CPC school-age) * (prob. SES sample)	0.4630	0.0026
(prob. CPC school-age) * (prob. health insurance sample)	0.4765	0.0027
(prob. CPC school-age) * (prob. TANF sample)	0.4901	0.0031
(prob. CPC extended) * (prob. educ. Sample)	0.3297	0.0024
(prob. CPC extended) * (prob. crime. sample)	0.3503	0.0024
(prob. CPC extended) * (prob. SES sample)	0.3035	0.0024
(prob. CPC extended) * (prob. health insurance sample)	0.3126	0.0025
(prob. CPC extended) * (prob. TANF sample)	0.3226	0.0027

Note: Propensity scores for program participation controls for 8 indicators of preprogram risk status, sex of child, race/ethnicity, low birth weight, age in months at kindergarten and home environment at ages 0-5. Propensity scores for sample retention controls for 8 indicators of preprogram risk status, sex of child, race/ethnicity, home environment at ages 0-5, school mobility, neighborhood residential mobility, having data on participant's social security number, percentage of unemployed in participant's neighborhood census tract, and percentage of females head of the household in participant's neighborhood census tract.

Table S6d. Probability of Program Participation and Recovery by Program and Comparison Group Status

Propensity Scores	Preschool		School-Age		Extended (PreK+ School Age)	
	Yes	No	Yes	No	Yes	No
Probability of CPC participation ¹	0.667	0.606	0.564	0.545	0.382	0.349
Prob. of being in the education sample	0.910	0.889	0.912	0.891	0.926	0.890
Prob. of being in the crime sample	0.962	0.962	0.971	0.951	0.976	0.954
Prob. of being in the SES sample	0.832	0.817	0.835	0.816	0.852	0.812
Prob. of being in the health insurance sample	0.860	0.836	0.856	0.846	0.873	0.839
Prob. of being in the TANF sample	0.895	0.916	0.898	0.907	0.899	0.904
(prob. CPC participation ¹) * (prob. educ. Sample)	0.608	0.541	0.516	0.489	0.355	0.315
(prob. CPC participation ¹) * (prob. crime. sample)	0.643	0.584	0.549	0.522	0.374	0.337
(prob. CPC participation ¹) * (prob. SES sample)	0.556	0.497	0.474	0.450	0.327	0.290
(prob. CPC participation ¹) * (prob. health insurance sample)	0.576	0.509	0.485	0.466	0.336	0.300
(prob. CPC participation ¹) * (prob. TANF sample)	0.599	0.557	0.509	0.498	0.344	0.320

Notes: ¹ Probability of CPC participation refers to the probability of CPC preschool participation for the first column, probability of CPC school-age participation for the second column, and probability of CPC extended group (preschool + school-age) for the last column.

- Propensity scores for program participation controls for 8 indicators of preprogram risk status, sex of child, race/ethnicity, low birth weight, age in months at kindergarten and home environment at ages 0-5. Propensity scores for sample retention controls for 8 indicators of preprogram risk status, sex of child, race/ethnicity, home environment at ages 0-5, school mobility, neighborhood residential mobility, having data on participant’s social security number, percentage of unemployed in participant’s neighborhood census tract, and percentage of females head of the household in participant’s neighborhood census tract.

Table S6e. Robustness Analysis for Predicting CPC Preschool Participation by Model Specification

Model variable	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z
Mother did not complete high school, child age 0-3	-0.105	0.003	-0.098	0.009	-0.108	0.002							-0.093	0.007
At least one parent completed high school at child birth							0.096	0.012						
Highest year of education of a parent at child birth									0.031	0.001				
At least one parent completed college at child birth											0.072	0.053	0.059	0.079
Child eligible for subsidized meals, child age 0-3	0.018	0.620	0.026	0.481	0.024	0.515	0.024	0.520	0.023	0.538	0.016	0.672	0.020	0.590
Mother under age 18 at child birth	-0.021	0.382	-0.015	0.493	-0.014	0.580	-0.009	0.760	-0.011	0.660	-0.049	0.011	-0.016	0.486
Four or more children in family, child age 0-3	-0.063	0.068	-0.045	0.204	-0.064	0.078	-0.069	0.076	-0.062	0.120	-0.071	0.055	-0.059	0.099
Participate in AFDC program, child age 0-3	-0.019	0.553	-0.010	0.763	-0.018	0.580	-0.031	0.298	-0.028	0.338	-0.020	0.541	-0.014	0.658
Mother not employed, child age 0-3	0.054	0.112	0.061	0.092	0.052	0.118	0.052	0.086	0.053	0.092	0.043	0.185	0.055	0.108
Single parent family status, child age 0-3	0.001	0.980	0.009	0.767	0.004	0.898	0.004	0.907	0.009	0.780	0.005	0.869	0.005	0.862
Indicator for missing risk factors, child age 0-3	-0.057	0.063	-0.065	0.030	-0.073	0.020	-0.066	0.060	-0.070	0.044	-0.087	0.006	-0.076	0.014
Low birth weight (<2500g)	-0.069	0.030	-0.058	0.073	-0.072	0.032	-0.072	0.035	-0.071	0.036	-0.071	0.034	-0.065	0.040
Child underage at preschool entry	-0.054	0.170	-0.045	0.243	-0.052	0.165	-0.050	0.194	-0.053	0.152	-0.043	0.250	-0.051	0.190
Family conflict, child age 0-5	0.006	0.895	-0.018	0.694	0.009	0.846	0.031	0.492	0.029	0.532	0.000	0.997	0.005	0.912
Family financial problems, child age 0-5	0.000	0.992	0.017	0.687	0.007	0.866	0.002	0.962	0.013	0.786	0.022	0.611	0.005	0.910
Substance abuse parent, child age 0-5	0.036	0.454	0.032	0.496	0.040	0.409	0.041	0.364	0.042	0.341	0.046	0.342	0.041	0.395
Female child	0.039	0.057	0.036	0.086	0.037	0.079	0.032	0.136	0.034	0.106	0.040	0.064	0.039	0.059
African American child	-0.087	0.685	-0.063	0.780	-0.062	0.771	-0.056	0.782	-0.093	0.633	-0.041	0.847	-0.090	0.674
Age in months at kindergarten	-0.012	0.031	-0.012	0.035	-0.013	0.027	-0.013	0.028	-0.013	0.023	-0.012	0.036	-0.012	0.037
Reside in high poverty neighborhood	0.618	0.000			1.027	0.031	1.045	0.032	1.074	0.027	0.975	0.037	0.637	0.000
Census tract female householder in poverty			0.608	0.027										
Census tract self-employed rate					-0.801	0.107	-0.829	0.095	-0.796	0.114	-0.759	0.13		
Census tract households receiving public aid					-0.262	0.529	-0.275	0.528	-0.307	0.479	-0.204	0.62		
Chi-squared	325.22		182.85		370.65		498.43		579.22		367.01		366.71	
Predicted propensity score	0.645	0.117	0.645	0.09	0.645	0.125	0.649	0.125	0.649	0.129	0.645	0.119	0.645	0.119

Note. Coefficients are from probit regression analysis and are marginal effects in percentage points.

Table S6f. Robustness Analysis for Predicting CPC School-Age Participation by Model Specification

Model variable	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z
Mother did not complete high school, child age 0-3	-0.065	0.043	-0.063	0.052	-0.064	0.540							-0.055	0.063
At least one parent completed high school at child birth							0.062	0.075						
Highest year of education of a parent at child birth									0.017	0.118				
At least one of parent completed college at child birth											0.066	0.148	0.051	0.248
Child eligible for subsidized meals, child age 0-3	-0.010	0.823	-0.002	0.957	-0.011	0.837	-0.005	0.902	-0.006	0.884	-0.015	0.725	-0.008	0.844
Mother under age 18 at child birth	0.012	0.792	0.021	0.638	0.010	0.163	0.025	0.619	0.020	0.685	-0.007	0.878	0.017	0.724
Four or more children in family, child age 0-3	-0.023	0.562	-0.011	0.788	-0.027	0.167	-0.026	0.550	-0.023	0.576	-0.028	0.476	-0.019	0.634
Participate in AFDC program, child age 0-3	0.040	0.155	0.043	0.126	0.040	0.626	0.041	0.150	0.040	0.156	0.040	0.169	0.044	0.133
Mother not employed, child age 0-3	0.012	0.762	0.016	0.675	0.008	0.662	0.007	0.864	0.007	0.860	0.004	0.909	0.013	0.740
Single parent family status, child age 0-3	-0.009	0.781	-0.004	0.911	-0.011	0.764	-0.030	0.431	-0.027	0.469	-0.008	0.810	-0.006	0.868
Indicator for missing risk factors, child age 0-3	-0.141	0.000	-0.147	0.000	-0.136	0.158	-0.186	0.000	-0.185	0.000	-0.150	0.000	-0.155	0.000
Low birth weight (<2500g)	0.001	0.979	0.004	0.904	-0.006	0.118	0.003	0.928	0.003	0.926	-0.004	0.922	0.004	0.909
Child underage at preschool entry	-0.042	0.288	-0.040	0.316	-0.043	0.221	-0.028	0.490	-0.030	0.459	-0.037	0.326	-0.040	0.307
Family conflict, child age 0-5	0.053	0.210	0.047	0.267	0.062	0.057	0.087	0.064	0.086	0.068	0.058	0.202	0.053	0.212
Family financial problems, child age 0-5	-0.016	0.734	-0.017	0.712	-0.015	0.070	-0.011	0.828	-0.004	0.933	-0.006	0.898	-0.013	0.788
Substance abuse parent, child age 0-5	-0.048	0.445	-0.052	0.393	-0.054	0.041	-0.062	0.338	-0.062	0.335	-0.048	0.451	-0.043	0.491
Female child	0.000	0.986	-0.001	0.960	0.001	0.503	0.001	0.977	0.002	0.942	0.003	0.910	0.000	0.997
African American child	0.007	0.967	0.019	0.911	-0.011	0.929	-0.026	0.868	-0.043	0.774	-0.001	0.996	0.005	0.977
Age in months at kindergarten	0.001	0.862	0.000	0.943	0.001	63.540	0.002	0.768	0.001	0.787	0.001	0.870	0.001	0.810
Reside in high poverty neighborhood	0.138	0.429			-0.096	0.417	-0.189	0.720	-0.179	0.737	-0.127	0.798	0.154	0.373
Census tract female householder in poverty			-0.243	0.494										
Census tract self-employed rate					-0.642	0.257	-0.574	0.172	-0.559	0.188	-0.604	0.156		
Census tract households receiving public aid					0.380	0.396	0.501	0.302	0.488	0.319	0.422	0.346		
Chi-squared	107.93		96.75		370.39		178.22		162.87		269.01		104.47	
Predicted propensity score	0.555		0.555		0.555		0.556		0.556		0.555		0.555	

Note. Coefficients are from probit regression analysis and are marginal effects in percentage points.

Table S6g. Robustness Analysis for Predicting CPC Extended Intervention Participation by Model Specification (Extended-1 Contrast)

Model variable	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z	dF/dx	P>z
Mother did not complete high school, child age 0-3	-0.095	0.004	-0.093	0.005	-0.097	0.003							-0.083	0.008
At least one parent completed high school at child birth							0.090	0.009						
Highest year of education of a parent at child birth									0.027	0.012				
At least one parent completed college at child birth											0.078	0.079	0.059	0.159
Child eligible for subsidized meals, child age 0-3	-0.012	0.811	-0.006	0.893	-0.008	0.866	-0.004	0.937	-0.003	0.949	-0.014	0.776	-0.010	0.842
Mother under age 18 at child birth	-0.020	0.637	-0.016	0.712	-0.016	0.708	-0.004	0.928	-0.010	0.816	-0.045	0.279	-0.015	0.724
Four or more children in family, child age 0-3	-0.017	0.579	-0.009	0.773	-0.019	0.533	-0.019	0.556	-0.014	0.659	-0.024	0.408	-0.012	0.686
Participate in AFDC program, child age 0-3	0.041	0.200	0.044	0.171	0.042	0.187	0.034	0.272	0.034	0.257	0.039	0.215	0.046	0.126
Mother not employed, child age 0-3	-0.002	0.962	0.001	0.967	-0.004	0.910	-0.001	0.985	-0.001	0.986	-0.010	0.778	-0.001	0.982
Single parent family status, child age 0-3	0.005	0.857	0.010	0.741	0.008	0.792	-0.004	0.912	0.002	0.956	0.010	0.729	0.010	0.717
Indicator for missing risk factors, child age 0-3	-0.163	0.000	-0.167	0.000	-0.170	0.000	-0.202	0.000	-0.202	0.000	-0.181	0.000	-0.177	0.000
Low birth weight (<2500g)	-0.042	0.192	-0.039	0.220	-0.045	0.157	-0.040	0.207	-0.040	0.207	-0.044	0.146	-0.039	0.215
Child underage at preschool entry	-0.038	0.367	-0.035	0.396	-0.036	0.379	-0.021	0.625	-0.023	0.582	-0.028	0.474	-0.035	0.396
Family conflict, child age 0-5	0.044	0.372	0.037	0.439	0.048	0.363	0.063	0.242	0.062	0.254	0.042	0.440	0.044	0.365
Family financial problems, child age 0-5	-0.100	0.003	-0.098	0.003	-0.095	0.004	-0.097	0.005	-0.088	0.011	-0.084	0.015	-0.097	0.005
Substance abuse parent, child age 0-5	0.070	0.146	0.066	0.162	0.070	0.146	0.068	0.176	0.069	0.161	0.079	0.109	0.076	0.121
Female child	0.031	0.281	0.030	0.299	0.030	0.301	0.026	0.372	0.028	0.335	0.034	0.255	0.031	0.276
African American child	-0.048	0.711	-0.037	0.776	-0.035	0.781	-0.043	0.724	-0.073	0.533	-0.015	0.906	-0.050	0.698
Age in months at kindergarten	-0.001	0.832	-0.001	0.795	-0.001	0.788	0.000	0.948	0.000	0.972	-0.001	0.827	-0.001	0.892
Reside in high poverty neighborhood	0.172	0.269			0.380	0.343	0.342	0.417	0.358	0.398	0.340	0.396	0.190	0.219
Census tract female householder in poverty			-0.015	0.954										
Census tract self-employed rate					-0.597	0.153	-0.561	0.182	-0.539	0.214	-0.549	0.199		
Census tract households receiving public aid					-0.097	0.788	-0.041	0.914	-0.057	0.882	-0.046	0.899		
Chi-squared	156.76		187.20		382.86		155.84		122.98		92.39		153.88	
Predicted propensity score	0.361		0.361		0.361		0.364		0.364		0.360		0.361	

Note. Coefficients are from probit regression analysis and are marginal effects in percentage points. Extended intervention-1 = CPC participation for 4 to 6 years (preschool to second or third grade) versus fewer years. Results for the extended intervention-2 contrast (4 to 6 years of participation versus those attending only in preschool and kindergarten) were nearly identical and are not shown.

Table S7a. Robustness Results for Selected Outcomes

Estimation Method	Preschool				School-Age				Extended-1				Extended-2			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff	p Value	Interv	Comp	Diff.	P Value	Interv	Comp, PK + K	Diff	P Value
SES \geq 4, %																
Unadjusted	36.4	29.3	7.1	.010	35.2	32.4	2.8	.306	38.3	31.4	6.9	.013	38.2	33.9	4.3	.252
Adjusted (with covariates ¹)	34.3	29.4	4.9	.066	33.1	31.9	1.2	.725	36.1	30.4	5.7	.042	35.3	32.1	3.2	.391
Adjusted (with covariates ²)	34.2	29.2	5.0	.058	33.	31.7	1.4	.690	36.1	30.3	5.8	.037	35.3	31.9	3.4	.369
Adjusted with attrition correction ³	34.2	28.8	5.4	.044	32.8	31.3	1.4	.679	35.8	30.3	5.5	.041	34.9	31.6	3.3	.348
Adjusted with attrition correction ⁴	36.0	29.9	6.1	.001	35.0	32.2	2.8	.350	37.9	32.2	5.7	.017	33.8	29.5	4.4	.060
Adjusted with attrition correction ⁵	34.2	29.1	5.1	.091	32.9	31.5	1.4	.683	36.0	30.1	5.9	.004	35.2	31.9	3.3	.372
Adjusted with selection correction ⁶	34.4	28.9	5.5	.055	32.9	31.6	1.3	.693	36.3	30.6	5.7	.036	35.5	31.9	3.6	.351
Adjusted with attrition & selection ⁷	34.4	28.6	5.8	.043	32.6	31.5	1.1	.717	36.1	30.6	5.4	.038	35.2	31.4	3.8	.303
Any health insurance, %																
Unadjusted	74.8	64.8	10.0	.000	71.4	71.1	0.3	.895	75.5	68.8	6.7	.010	75.4	75.1	0.3	.925
Adjusted (with covariates ¹)	76.7	66.6	10.1	.000	72.0	75.1	-3.1	.184	76.8	71.2	5.6	.009	77.3	77.2	0.1	.982
Adjusted (with covariates ²)	76.8	66.8	10.0	.000	72.3	75.0	-2.7	.234	77.1	71.3	5.8	.006	77.5	76.9	0.6	.839
Adjusted with attrition correction ³	75.7	63.6	12.1	.000	70.1	73.6	-3.5	.140	75.3	69.4	5.9	.005	75.8	76.4	-0.6	.835
Adjusted with attrition correction ⁴	75.2	68.4	6.8	.001	72.5	71.2	1.3	.542	76.5	70.3	6.2	.016	NA	NA	NA	NA
Adjusted with attrition correction ⁵	75.4	66.1	9.3	.000	71.0	73.2	-2.2	.325	76.3	70.8	5.5	.008	76.9	76.0	0.9	.784
Adjusted with selection correction ⁶	76.0	67.0	9.0	.000	70.9	73.8	-2.9	.216	75.5	70.1	5.4	.009	76.2	76.0	0.2	.956
Adjusted with attrition & selection ⁷	76.3	65.8	10.6	.000	70.4	73.6	-3.2	.180	75.4	69.5	5.9	.004	75.9	76.1	-0.2	.952
Any felony charge, %																
Unadjusted	19.2	25.6	-6.4	.005	21.6	21.5	0.1	.976	19.5	22.7	-3.2	.153	19.5	18.3	1.2	.673
Adjusted (with covariates ¹)	13.4	17.8	-4.4	.051	15.4	14.1	1.3	.487	14.0	15.4	-1.4	.573	14.3	12.8	1.5	.591
Adjusted (with covariates ²)	13.0	17.9	-4.9	.030	15.0	14.0	1.0	.584	13.5	15.3	-1.8	.452	13.8	12.5	1.3	.624
Adjusted with attrition correction ³	13.1	17.9	-4.8	.036	15.3	13.9	1.4	.432	14.0	15.3	-1.3	.593	14.2	12.2	2.0	.499
Adjusted with attrition correction ⁴	19.3	25.1	-5.8	.005	21.3	21.3	0.0	.891	19	22.5	-3.5	0.057	NA	NA	NA	NA
Adjusted with attrition correction ⁵	12.7	17.7	-5.0	.028	14.9	14.0	0.9	.651	13.4	15.4	-2.0	0.412	0.1	-1.2	1.3	.668
Adjusted with selection correction ⁶	12.7	17.0	-4.4	.038	15.2	14.3	0.9	.622	13.8	15.5	-1.6	.501	14.1	13.1	1.0	.742
Adjusted with attrition & selection ⁷	12.5	17.1	-4.6	.030	15.2	14.0	1.2	.532	13.9	15.3	-1.4	.551	14.2	12.8	1.4	.645
Substance abuse (excluding alcohol), %																
Unadjusted	18.9	25.4	-6.5	.004	21.2	21.3	-0.1	.947	19.0	22.6	-3.6	.101	18.9	20.4	-1.5	.617
Adjusted (with covariates ¹)	14.3	18.8	-4.5	.021	16.3	15.0	1.3	.641	14.8	16.4	-1.6	.582	15.1	16.0	-0.9	.837
Adjusted (with covariates ²)	13.9	18.8	-4.9	.013	16.0	14.9	1.1	.690	14.4	16.3	-1.9	.478	14.7	15.8	-1.1	.790
Adjusted with attrition correction ³	14.1	18.9	-4.8	.017	16.4	14.8	1.6	.563	14.8	16.3	-1.6	.581	15.1	15.6	-0.5	.902
Adjusted with attrition correction ⁴	19.2	25.3	-6.1	.004	21.1	21.1	0.0	.879	19.0	22.5	-3.5	.110	20.8	23.7	-2.9	.065

Table S7a. Robustness Results for Selected Outcomes (Continued)

Estimation Method	Preschool				School-Age				Extended-1				Extended-2			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value
Adjusted with attrition correction ⁵	13.8	18.7	-4.9	.013	16.1	15.2	0.9	.753	14.4	16.6	-2.2	.417	14.7	16.1	-1.4	.752
Adjusted with selection correction ⁶	13.8	17.9	-4.1	.012	16.3	15.3	0.9	.741	15.0	17.0	-2.0	.485	15.3	16.6	-1.3	.763
Adjusted with attrition & selection ⁷	13.6	17.9	-4.3	.010	16.4	15.0	1.4	.633	14.9	16.8	-1.8	.514	15.3	16.3	-1.0	.818
Substance abuse with alcohol, %																
Unadjusted	23.6	31.8	-8.1	0.002	25.7	27.6	-1.9	0.732	22.9	28.7	-5.8	0.025	22.6	26.5	-3.9	0.338
Adjusted (with covariates ¹)	19.8	24.6	-4.8	0.026	21.4	21.5	-0.1	0.982	20.4	22.2	-1.8	0.607	20.4	22.6	-2.2	0.649
Adjusted (with covariates ²)	19.3	24.5	-5.1	0.021	20.9	21.3	-0.4	0.892	19.8	22.0	-2.1	0.525	19.8	22.4	-2.6	0.584
Adjusted with attrition correction ³	19.0	24.8	-5.7	0.012	21.1	20.9	0.2	0.944	19.9	21.9	-2.0	0.554	19.9	21.7	-1.9	0.690
Adjusted with attrition correction ⁴	23.7	31.2	-7.5	0.002	25.6	27.3	-1.7	0.732	22.4	25.2	-2.8	0.390	26.6	29.6	-3.0	0.442
Adjusted with attrition correction ⁵	19.2	24.3	-5.1	0.021	20.7	20.2	0.5	0.863	19.7	21.9	-2.2	0.505	19.7	22.4	-2.7	0.568
Adjusted with selection correction ⁶	19.1	24.7	-5.6	0.018	20.9	21.8	-0.9	0.766	19.8	22.4	-2.6	0.431	19.8	23.2	-3.4	0.476
Adjusted with attrition & selection ⁷	18.3	24.1	-5.8	0.005	21.1	21.4	-0.3	0.928	19.8	22.3	-2.4	0.466	19.8	22.5	-2.7	0.564
Ever incarcerated or jail, %																
Unadjusted	20.87	28.02	-7.15	0.002	23.63	23.14	0.49	0.825	19.85	25.49	-5.64	0.014	22.38	23.82	-1.44	0.648
Adjusted (with covariates ¹)	19.74	25.07	-5.33	0.051	21.57	19.28	2.29	0.333	18.71	21.67	-2.96	0.227	21.69	22.13	-0.44	0.898
Adjusted (with covariates ²)	19.15	24.87	-5.72	0.032	20.93	18.99	1.94	0.409	17.97	21.38	-3.41	0.143	20.93	21.83	-0.90	0.780
Adjusted with attrition correction ³	19.19	25.07	-5.88	0.037	21.08	19.02	2.06	0.400	18.10	21.42	-3.32	0.158	21.06	21.93	-0.87	0.795
Adjusted with attrition correction ⁴	20.62	27.26	-6.64	0.001	23.21	22.51	0.70	0.921	19.09	22.43	-3.34	0.159	20.90	27.30	-6.40	0.051
Adjusted with attrition correction ⁵	19.19	24.92	-5.73	0.031	21.03	19.01	2.02	0.383	18.03	21.38	-3.35	0.149	21.00	21.80	-0.80	0.803
Adjusted with selection correction ⁶	18.90	25.55	-6.65	0.021	20.82	18.40	2.42	0.349	18.09	21.80	-3.71	0.119	21.06	22.04	-0.98	0.761
Adjusted with attrition & selection ⁷	18.54	23.69	-5.15	0.026	20.99	19.04	1.95	0.358	18.19	21.80	-3.61	0.135	21.16	22.11	-0.95	0.776
Years of education																
Unadjusted	12.2	11.8	0.3	0.001	12.1	12.0	0.2	0.089	12.3	11.9	0.3	0.001	12.2	12.0	0.2	0.070
Adjusted (with covariates ¹)	12.1	11.9	0.2	0.057	12.1	12.0	0.1	0.415	12.1	12.0	0.1	0.103	12.1	12.0	0.1	0.328
Adjusted (with covariates ²)	12.1	11.9	0.2	0.054	12.1	12.0	0.1	0.416	12.1	12.0	0.1	0.100	12.1	12.0	0.1	0.351
Adjusted with attrition correction ³	12.1	11.9	0.3	0.028	12.1	12.0	0.0	0.664	12.1	12.0	0.1	0.128	12.1	12.1	0.1	0.548
Adjusted with attrition correction ⁴	12.2	12.0	0.2	0.049	12.2	12.0	0.2	0.080	12.3	12.0	0.3	0.006	12.0	12.0	0.0	0.857
Adjusted with attrition correction ⁵	12.1	11.9	0.2	0.063	12.1	12.0	0.1	0.457	12.1	12.0	0.1	0.111	12.1	12.0	0.1	0.372
Adjusted with selection correction ⁶	12.1	11.9	0.2	0.099	12.1	12.0	0.1	0.304	12.2	12.0	0.2	0.067	12.2	12.0	0.2	0.191
Adjusted with attrition & selection ⁷	12.2	11.9	0.3	0.044	12.1	12.0	0.1	0.521	12.2	12.0	0.2	0.095	12.2	12.0	0.1	0.329

Note. 1. Adjusted for school-age participation (preschool participation), 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. Robust standard errors were used. 2. Adjusted for school-age participation, 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. School poverty was replaced with neighborhood poverty at 1980. Home environment at ages 0-5 was included. Robust standard errors were used. 3. Inverse probability weighting (IPW) of being in the study sample was created. This variable was used as a sampling weight in the model. 4. Propensity score matching using a kernel bi-weight was employed to correct for attrition. 5 The probability of retention (propensity score) was used as a regressor. 6. Inverse probability weighting of being in the CPC program group was created. This variable was used as a sampling weight in the model. 7. Inverse probability weighting was obtained by multiplying the IPW of being in the study sample and the IPW of being in the program group. This variable was used as a sampling weight in the model. NA: Models were not estimated.

Table S7b. Additional Robustness Results for Selected Adult Outcomes

Estimation Method	Preschool				School-Age				Extended-1			
	Interv	Comp	Diff.	p-value	Interv	Comp	Diff.	p-value	Interv	Comp	Diff.	p-value
Highest grade completed												
Unadjusted	12.180	11.848	0.332	0.001	12.135	11.974	0.161	0.089	12.272	11.940	0.332	0.001
Adjusted (with covariates)	12.129	11.901	0.228	0.051	12.081	12.006	0.076	0.425	12.216	11.950	0.265	0.015
Adjusted with attrition correction												
Inverse probability weighting	12.142	11.879	0.263	0.027	12.066	12.026	0.040	0.672	12.211	11.955	0.256	0.019
Reg. propensity score	12.121	11.902	0.219	0.060	12.074	12.005	0.069	0.469	12.203	11.951	0.252	0.020
Adjusted with selection correction												
Inverse probability weighting	12.156	11.929	0.227	0.060	12.086	11.988	0.097	0.303	12.230	11.950	0.280	0.014
Reg. propensity score	12.139	11.881	0.258	0.039	12.085	12.004	0.082	0.378	12.222	11.947	0.275	0.012
Adjusted with attrition & selection												
Inverse probability weighting	12.166	11.916	0.250	0.038	12.067	12.007	0.060	0.520	12.223	11.954	0.268	0.019
Reg. propensity score	12.139	11.887	0.252	0.045	12.087	12.005	0.082	0.389	12.221	11.949	0.272	0.013
Substance abuse (excluding alcohol), %												
Unadjusted	18.947	25.430	-6.483	0.004	21.186	21.329	-0.143	0.947	18.969	0.226	-3.612	0.102
Adjusted (with covariates)	18.322	22.808	-4.486	0.021	16.363	15.167	1.196	0.663	14.838	0.165	-1.671	0.556
Adjusted with attrition correction												
Inverse probability weighting	18.700	23.934	-5.234	0.012	16.100	14.731	1.369	0.563	14.300	0.162	-1.900	0.581
Reg. propensity score	18.173	22.936	-4.762	0.021	16.133	15.074	1.059	0.706	14.568	0.164	-1.842	0.514
Adjusted with selection correction												
Inverse probability weighting	18.835	23.938	-5.103	0.012	16.280	15.332	0.948	0.741	14.980	0.170	-1.981	0.485
Reg. propensity score	14.243	19.161	-4.918	0.014	16.321	15.161	1.160	0.673	14.624	0.165	-1.921	0.506
Adjusted with attrition & selection												
Inverse probability weighting	18.611	23.342	-4.731	0.010	16.360	15.003	1.357	0.633	14.939	0.168	-1.848	0.514
Reg. propensity score	18.164	23.616	-5.452	0.009	16.145	15.113	1.032	0.711	14.487	0.165	-2.029	0.482
Occupational prestige composite (1-8)												
Unadjusted	2.815	2.506	0.309	0.000	2.737	2.665	0.072	0.390	2.898	2.591	0.306	0.000
Adjusted (with covariates)	2.794	2.552	0.242	0.020	2.710	2.706	0.003	0.981	2.871	2.612	0.259	0.022
Adjusted with attrition correction												
Inverse probability weighting	2.800	2.548	0.252	0.022	2.702	2.722	-0.020	0.878	2.863	2.622	0.241	0.031
Reg. propensity score	2.794	2.553	0.242	0.021	2.710	2.706	0.004	0.976	2.873	2.613	0.260	0.020
Adjusted with selection correction												
Inverse probability weighting	2.814	2.564	0.250	0.014	2.704	2.693	0.011	0.935	2.850	2.610	0.241	0.033
Reg. propensity score	2.803	2.537	0.266	0.019	2.710	2.706	0.003	0.981	2.869	2.613	0.256	0.024
Adjusted with attrition & selection												
Inverse probability weighting	2.819	2.562	0.257	0.015	2.693	2.708	-0.015	0.907	2.840	2.623	0.217	0.052
Reg. propensity score	2.806	2.539	0.266	0.017	2.709	2.706	0.003	0.981	2.867	2.613	0.255	0.023

Table. S7b. Additional Robustness Results for Selected Adult Outcomes (Continued)

Estimation Method	Preschool				School-Age				Extended-1			
	Interv	Comp	Diff.	p-value	Interv	Comp	Diff.	p-value	Interv	Comp	Diff.	p-value
Any felony charge, %												
Unadjusted	19.263	25.621	-6.358	0.005	21.550	21.484	0.066	0.976	19.521	22.688	-3.167	0.154
Adjusted (with covariates)	18.827	23.863	-5.036	0.027	19.910	18.965	0.945	0.612	18.445	20.298	-1.853	0.434
Adjusted with attrition correction												
Inverse probability weighting	18.640	23.951	-5.311	0.021	19.932	18.717	1.215	0.512	18.463	20.130	-1.667	0.478
Reg. propensity score	18.739	23.757	-5.018	0.028	19.770	18.914	0.856	0.651	18.276	20.237	-1.961	0.412
Adjusted with selection correction												
Inverse probability weighting	18.750	24.373	-5.623	0.030	19.810	18.573	1.237	0.573	18.388	20.423	-2.035	0.395
Reg. propensity score	18.531	24.305	-5.774	0.010	19.847	18.586	1.261	0.495	18.272	20.331	-2.059	0.384
Adjusted with attrition & selection												
Inverse probability weighting	18.138	23.269	-5.131	0.017	19.850	18.454	1.396	0.440	18.449	20.258	-1.809	0.447
Reg. propensity score	18.429	24.148	-5.719	0.010	19.680	18.551	1.129	0.542	18.174	20.299	-2.125	0.370
Any health insurance, %												
Unadjusted	74.706	64.758	9.948	0.000	71.389	71.057	0.332	0.895	75.410	68.750	6.660	0.010
Adjusted (with covariates)	75.727	65.734	9.993	0.000	71.072	73.749	-2.677	0.238	75.971	70.191	5.780	0.005
Adjusted with attrition correction												
Inverse probability weighting	75.942	63.909	12.033	0.000	73.553	76.686	-3.133	0.165	75.680	69.577	6.103	0.003
Reg. propensity score	75.057	65.778	9.279	0.000	70.838	72.998	-2.160	0.325	75.352	69.815	5.537	0.008
Adjusted with selection correction												
Inverse probability weighting	76.040	66.745	9.295	0.000	71.290	73.798	-2.508	0.327	75.918	70.133	5.785	0.004
Reg. propensity score	75.814	65.549	10.265	0.000	71.054	73.879	-2.825	0.203	75.879	70.248	5.631	0.007
Adjusted with attrition & selection												
Inverse probability weighting	72.244	61.614	10.630	0.000	70.823	75.635	-4.812	0.041	75.750	69.558	6.192	0.001
Reg. propensity score	75.454	66.042	9.412	0.000	71.667	74.004	-2.337	0.278	75.509	70.264	5.245	0.014

Note. Adjusted means or percentages are shown along with the group difference marginal effects. Extended-1 = Extended intervention participation for 4 to 6 years (preschool to second or third grade) versus fewer years.

Table S8. Unadjusted Means for Adult Outcomes by Age 28

Outcomes	Preschool ¹				School-Age ²				Extended-1 ³				Extended-2 ⁴			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	p Value	Interv	Comp	Diff.	P Value	Interv	Comp, PK + K	Diff.	P Value
Educational Attainment																
On time graduation, %	44.31	34.74	9.57	0.000	44.41	36.54	7.87	0.003	48.58	36.47	12.11	0.000	48.58	38.85	9.73	0.008
High school completion, %	80.29	72.73	7.56	0.001	79.32	75.49	3.83	0.090	81.75	75.20	6.55	0.005	81.75	76.75	5.00	0.098
Highest grade completed	12.18	11.85	0.33	0.001	12.13	11.97	0.16	0.089	12.27	11.94	0.33	0.001	12.27	12.03	0.24	0.068
College attendance, %	35.19	33.06	2.13	0.426	35.79	32.73	3.06	0.235	38.25	32.18	6.07	0.022	38.25	30.63	7.62	0.033
4-year college attendance, %	14.70	10.54	4.16	0.028	14.22	12.01	2.21	0.229	15.72	11.76	3.96	0.037	15.72	13.65	2.07	0.437
BA or AA degree, %	8.46	7.64	0.82	0.595	8.78	7.40	1.38	0.351	9.51	7.38	2.13	0.164	9.51	6.64	2.87	0.167
Socioeconomic Status																
Occupational prestige composite (1-8)	2.82	2.51	0.31	0.000	2.73	2.66	0.07	0.390	2.90	2.59	0.31	0.000	2.90	2.78	0.12	0.330
Occupational prestige ≥ 4, %	30.19	22.78	7.41	0.004	27.73	27.35	0.38	0.877	31.33	25.33	6.00	0.018	31.33	30.47	0.86	0.810
SES composite (0-8)	3.02	2.64	0.38	0.007	3.00	2.74	0.26	0.062	3.21	2.70	0.51	0.000	3.21	2.74	0.47	0.014
SES ≥ 4, %	36.42	29.28	7.14	0.010	35.12	32.37	2.75	0.306	38.22	31.36	6.86	0.013	38.22	33.88	4.34	0.252
AA or BA or employed 8+ quarters, %	47.35	42.36	4.99	0.075	45.76	45.41	0.35	0.897	48.46	43.89	4.57	0.098	48.46	45.05	3.41	0.361
Average annual income, (\$)	11,658	10,726	932	0.001	11,355	11,301	54	0.846	12,022	10,920	1,102	0.074	12,022	11,474	548	0.569
Average annual income 14K or higher, %	34.08	30.48	3.60	0.198	32.61	33.09	-0.48	0.858	34.94	31.57	3.37	0.224	34.94	34.02	0.90	0.813
Full-time employment (8 or more quarters), %	24.61	24.65	-0.04	0.989	24.42	24.89	-0.47	0.861	26.11	23.69	2.42	0.375	26.11	23.76	2.35	0.530
Public Aid																
Ages 18-23																
Any food stamp participation, %	55.64	58.24	-2.60	0.361	55.50	57.93	-2.43	0.374	55.17	57.43	-2.26	0.419	55.17	58.40	-3.23	0.398
2 or more years participation in food stamp, %	26.39	28.27	-1.88	0.461	25.16	29.48	-4.32	0.079	24.96	28.35	-3.39	0.174	24.96	29.20	-4.24	0.213
Any TANF participation, %	25.92	24.41	1.51	0.545	24.77	26.21	-1.44	0.550	25.35	25.43	-0.08	0.972	25.35	29.60	-4.25	0.214
2 or more years participation in TANF, %	9.45	7.28	2.17	0.178	8.35	9.14	-0.79	0.610	9.36	8.28	1.08	0.495	9.36	10.80	-1.44	0.531
Ages 24-27																
Any food stamp participation, %	48.73	46.25	2.48	0.387	46.62	49.48	-2.86	0.300	46.78	48.54	-1.76	0.532	46.78	52.80	-6.02	0.119
2 or more years participation in food stamp, %	21.66	23.13	-1.47	0.539	21.98	22.41	-0.43	0.852	21.83	22.38	-0.55	0.813	21.83	22.00	-0.17	0.958
Any TANF participation, %	10.02	9.42	0.60	0.724	9.4	10.34	-0.94	0.567	9.75	9.85	-0.10	0.949	9.75	11.60	-1.85	0.433
2 or more years participation in TANF, %	1.61	2.14	-0.53	0.491	1.99	1.55	0.44	0.553	1.56	1.95	-0.39	0.604	1.56	1.60	-0.04	0.966

Table S8. Unadjusted Means for Adult Outcomes by Age 28 (Continued)

Outcomes	Preschool ¹				School-Age ²				Extended-1 ³				Extended-2 ⁴			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value
Health Status and Behavior																
Any insurance, %	74.71	64.76	9.95	0.000	71.39	71.06	0.33	0.895	75.41	68.75	6.66	0.010	75.41	75.10	0.31	0.925
Any public insurance, %	30.12	26.43	3.69	0.161	27.79	30.16	-2.37	0.348	27.05	29.90	-2.85	0.370	27.05	32.69	-5.64	0.108
Any private insurance, %	49.06	41.19	7.87	0.007	47.63	44.54	3.19	0.251	52.46	42.65	9.81	0.001	52.46	46.30	6.16	0.110
Substance abuse (excluding alcohol), %	18.95	25.43	-6.48	0.004	21.19	21.33	-0.14	0.947	18.97	22.58	-3.61	0.101	18.97	20.42	-1.45	0.617
Drug and alcohol abuse, %	21.19	29.53	-8.34	0.001	23.20	25.22	-2.02	0.392	20.47	26.30	-5.83	0.015	20.47	24.22	-3.75	0.237
Crime and Justice System Involvement																
Any adult arrest (include self-report), %	48.10	54.30	-6.20	0.023	52.4	47.5	4.9	0.096	49.35	50.85	-1.50	0.577	49.35	45.42	3.93	0.282
Any violent charge, %	19.89	22.75	-2.86	0.198	18.2	17.6	0.6	0.769	18.78	22.15	-3.37	0.124	18.79	20.07	-1.29	0.656
Any conviction, %	25.05	30.21	-5.16	0.033	27.0	25.9	1.1	0.654	24.12	28.49	-4.37	0.067	24.12	25.35	-1.23	0.697
Number of adult arrests	1.68	1.92	-0.24	0.203	1.7	1.8	-0.1	0.462	1.60	1.86	-0.26	0.170	1.60	1.81	-0.21	0.406
Any felony charge, %	19.26	25.62	-6.36	0.005	21.6	20.4	1.2	0.512	19.52	22.69	-3.17	0.153	19.52	18.31	1.21	0.673
Number of felony charges	0.46	0.58	-0.12	0.056	0.5	0.5	0.0	0.557	0.46	0.53	-0.07	0.246	0.46	0.46	-0.00	0.972
Ever incarcerated or jail (include self-report), %	20.87	28.02	-7.15	0.002	18.1	16.0	2.1	0.400	19.85	25.48	-5.63	0.014	19.85	21.20	-1.35	0.648
Family Status																
Age at birth of first child	19.22	18.99	0.23	0.259	19.20	19.06	0.14	0.465	19.34	19.01	0.33	0.101	19.34	19.09	0.25	0.361
Parenthood, %	64.48	63.53	0.95	0.741	65.80	62.09	3.71	0.178	65.58	63.29	2.29	0.417	65.58	62.90	2.68	0.477
Number of children	1.14	1.30	-0.16	0.835	1.33	1.26	0.07	0.385	1.31	1.29	0.02	0.832	1.31	1.26	0.05	0.662
Had 3 or more children, %	18.69	18.35	0.34	0.886	19.07	17.95	1.12	0.615	19.05	18.29	0.76	0.740	19.05	18.15	0.90	0.769
If married or living with partner, %	25.17	25.52	-0.35	0.897	25.86	24.54	1.32	0.613	25.23	25.33	-0.10	0.971	25.23	26.70	-1.47	0.685

Note. Extended intervention-1 = CPC participation for 4 to 6 years (preschool to second or third grade) versus fewer years. Extended intervention-2 = CPC participation for 4 to 6 years versus participation in preschool and kindergarten only.

Table S9. Adjusted Means with IPW Attrition Correction and Robust Standard Errors for Adult Outcomes by Age 28

Outcomes	Preschool ¹				School-Age ²				Extended-1 ³				Extended-2 ⁴			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	p Value	Interv	Comp	Diff.	P Value	Interv	Comp, PK + K	Diff.	P Value
Educational Attainment																
On time graduation, %	44.3	36.6	7.7	0.018	44.4	35.3	9.1	0.011	48.6	31.3	17.3	0.001	48.6	33.3	15.3	0.026
High school completion, %	81.5	75.1	6.4	0.007	80.0	78.5	1.5	0.493	82.7	77.2	5.5	0.010	81.5	79.6	1.9	0.519
Highest grade completed	12.1	11.9	0.3	0.028	12.1	12.0	0.0	0.664	12.2	12.0	0.3	0.020	12.1	12.1	0.1	0.548
College attendance, %	32.8	33.4	-0.7	0.841	34.3	31.4	3.0	0.287	35.7	31.5	4.2	0.183	34.4	29.6	4.8	0.233
4-year college attendance, %	14.7	10.5	3.5	0.040	14.2	13.6	0.6	0.767	14.7	11.8	2.9	0.240	15.7	16.4	-0.7	0.803
BA or AA degree, %	8.4	8.5	-0.1	0.916	8.8	7.4	1.4	0.386	9.5	8.3	1.2	0.292	9.5	8.1	1.4	0.477
Socioeconomic Status																
Occupational prestige composite (1-8)	2.8	2.5	0.3	0.025	2.7	2.7	0.0	0.856	2.9	2.6	0.2	0.034	2.8	2.8	0.0	0.876
Occupational prestige \geq 4, %	28.2	21.4	6.8	0.012	24.7	26.9	-2.1	0.509	28.4	24.3	4.1	0.200	26.8	28.4	-1.6	0.735
SES composite (0-8)	3.0	2.7	0.2	0.103	3.0	2.8	0.2	0.336	3.1	2.7	0.4	0.017	3.1	2.7	0.3	0.132
SES \geq 4, %	34.4	28.6	5.7	0.031	32.8	31.6	1.2	0.702	35.9	30.3	5.6	0.036	34.9	31.6	3.3	0.338
AA or BA or employed 8+ quarters, %	45.7	40.6	5.0	0.238	43.6	44.2	-0.6	0.892	46.2	42.5	3.6	0.193	45.5	43.7	1.8	0.649
Average annual income, (\$)	11,582	10,796	786	0.017	11,250	11,278	-28	0.296	11,822	10,942	880	0.150	11,737	11,232	505	0.373
Average annual income 14K or higher, %	32.5	29.4	3.1	0.363	31.2	31.7	-0.5	0.898	32.9	30.6	2.3	0.430	32.1	31.5	0.6	0.860
Full-time employment (8 or more quarters), %	24.0	25.9	-2.0	0.630	25.4	23.8	1.6	0.710	25.4	24.3	1.1	0.683	25.1	21.0	4.1	0.302
Public Aid																
Ages 18-23																
Any food stamp participation, %	54.8	59.6	-4.9	0.043	55.2	58.1	-2.8	0.290	53.9	58.0	-4.1	0.198	55.0	57.7	-2.7	0.451
2 or more years participation in food stamp, %	26.4	27.5	-1.1	0.647	25.2	29.4	-4.2	0.089	25.0	28.8	-3.8	0.190	25.0	22.2	-2.8	0.358
Any TANF participation, %	25.9	24.4	1.5	0.496	24.8	25.1	-0.3	0.921	25.3	25.3	0.0	0.989	25.3	21.5	-3.8	0.194
2 or more years participation in TANF, %	9.5	7.0	2.5	0.103	8.3	9.8	-1.5	0.440	9.4	8.2	1.2	0.438	9.4	8.9	-0.5	0.824
Ages 24-27																
Any food stamp participation, %	49.1	44.8	4.3	0.119	43.9	52.0	-8.1	0.019	45.0	48.9	-3.9	0.307	45.9	54.2	-8.3	0.094
2 or more years participation in food stamp, %	15.6	18.1	-2.5	0.200	16.5	16.4	0.1	0.965	15.5	17.1	-1.6	0.529	15.9	16.0	-0.1	0.984
Any TANF participation, %	10.0	9.4	0.6	0.587	9.8	10.9	-1.1	0.363	9.8	10.4	-0.6	0.582	9.8	11.4	-1.6	0.247
2 or more years participation in TANF, %	1.6	2.2	-0.6	0.063	2.0	1.6	0.4	0.131	1.6	1.6	0.0	0.862	1.6	1.3	0.3	0.351
Health Status and Behavior																
Any insurance, %	75.9	63.9	12.0	0.00	70.5	73.7	-3.1	0.165	75.7	69.6	6.1	0.000	75.7	70.9	4.8	0.485
Any public insurance, %	25.4	20.9	4.5	0.128	22.2	25.7	-3.6	0.179	21.4	25.2	-3.8	0.070	23.4	22.9	0.6	0.947

Table S9. Adjusted Means with IPW Attrition Correction and Robust Standard Errors for Adult Outcomes by Age 28 (Continued)

Outcomes	Preschool ¹				School-Age ²				Extended-1 ³				Extended-2 ⁴			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value
Any private insurance, %	49.1	39.5	9.6	0.006	45.6	45.7	-0.1	0.972	51.8	42.2	9.6	0.001	50.2	45.6	4.6	0.449
Substance abuse (excluding alcohol), %	13.7	18.9	-5.2	0.012	16.1	14.7	1.4	0.605	14.3	16.2	-1.9	0.484	14.7	15.4	-0.8	0.856
Drug and alcohol abuse, %	16.5	23.0	-6.6	0.004	18.4	18.9	-0.5	0.859	16.2	20.3	-4.2	0.158	16.7	19.8	-3.1	0.474
Crime and Justice System Involvement																
Any adult arrest (include self-report), %	47.9	54.3	-6.4	0.033	52.4	47.5	4.9	0.096	51.1	49.7	1.4	0.651	51.8	44.8	7.0	0.124
Any violent charge, %	17.2	19.4	-2.2	0.206	18.2	17.6	0.6	0.769	16.6	18.7	-2.1	0.322	17.2	19.4	-2.2	0.206
Any conviction, %	25.1	28.8	-3.7	0.135	27.0	25.9	1.1	0.654	24.1	26.7	-2.6	0.295	24.1	24.4	-0.3	0.932
Number of adult arrests	1.7	1.8	0.0	0.838	1.7	1.8	-0.1	0.462	1.7	1.8	-0.1	0.563	1.7	1.8	-0.1	0.712
Any felony charge, %	19.3	24.6	-5.3	0.021	21.6	20.4	1.2	0.512	19.5	21.2	-1.7	0.478	19.5	21.4	1.9	0.516
Number of felony charges	0.5	0.6	-0.1	0.167	0.5	0.5	0.0	0.557	0.5	0.5	0.0	0.601	0.5	0.5	0.0	0.651
Ever incarcerated or jail (include self-report), %	15.2	21.1	-5.9	0.037	18.1	16.0	2.1	0.400	14.9	18.6	-3.7	0.123	15.1	15.9	-0.9	0.795
Family Status																
Age at birth of first child	19.4	19.1	0.3	0.176	19.4	19.2	0.2	0.329	19.5	19.1	0.4	0.098	19.5	19.1	0.4	0.193
Parenthood, %	62.9	63.2	-0.3	0.945	65.7	59.6	6.0	0.051	65.2	61.7	3.5	0.332	65.7	61.1	4.6	0.199
Number of children	1.2	1.3	-0.1	0.518	1.3	1.2	0.1	0.135	1.2	1.2	0.0	0.918	1.2	1.2	0.1	0.577
Had 3 or more children, %	14.5	15.5	-1.1	0.657	15.5	14.1	1.4	0.525	15.1	14.7	0.3	0.906	15.3	14.3	1.1	0.748
If married or living with partner, %	24.4	25.5	-1.1	0.679	26.0	23.4	2.6	0.376	24.8	24.8	0.0	0.985	24.5	25.8	-1.3	0.707

Note. Extended intervention-1 = CPC participation for 4 to 6 years (preschool to second or third grade) versus fewer years. Extended intervention-2 = CPC participation for 4 to 6 years versus participation in preschool and kindergarten only.

1. Adjusted for school-age participation, 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. School poverty is replaced with neighborhood poverty at 1980. Home environment at ages 0-5 is included. Robust standard errors were used. Attrition was adjusted through including inverse probability weighting (IPW) of being in the study sample as a sampling weight in the model.
2. Adjusted for preschool participation, 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. School poverty is replaced with neighborhood poverty at 1980. Home environment at ages 0-5 is included. Robust standard errors were used. Attrition was adjusted through including IPW of being in the study sample as a sampling weight in the model.
3. Adjusted for 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. School poverty is replaced with neighborhood poverty at 1980. Home environment at ages 0-5 is included. Robust standard errors were used. Attrition was adjusted through including IPW of being in the study sample as a sampling weight in the model.
4. Adjusted for 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, a dummy-coded variable for missing data on risk status, and word analysis scores at kindergarten. School poverty is replaced with neighborhood poverty at 1980. Home environment at ages 0-5 is included. Robust standard errors were used. Attrition was adjusted through including inverse probability weighting (IPW) of being in the study sample as a sampling weight in the model.

*Sample sizes vary by measures: occupational prestige by age 24 (N=1,335); SES ages 24-27 (N=1,265), adult crime by age 26 (N=1,473). The sample sizes for the family status outcomes except marital status (N=1,127) are 1,233.

Table S10. Unadjusted Means by Subgroups and Program Components

Outcome and subgroup	Preschool				School-Age				Extended-1				Extended-2			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	p Value	Interv	Comp	Diff.	P Value	Interv	Comp, PK + K	Diff.	P Value
A. High school completion, %																
Female	84.06	82.48	1.58	0.594	87.16	78.85	8.31	0.003	87.64	80.88	6.76	0.016	87.64	75.18	12.46	0.001
Male	75.90	63.60	12.30	0.001	70.73	71.96	-1.23	0.728	74.57	69.52	5.05	0.168	74.57	78.46	-3.89	0.001
Mother completed HS	85.84	82.50	3.34	0.277	85.71	83.52	2.19	0.446	87.64	82.80	4.84	0.091	87.64	84.25	3.39	0.360
Mother not completed HS	74.84	65.85	8.99	0.009	73.23	69.21	4.02	0.229	75.41	69.33	6.08	0.083	75.41	70.14	5.27	0.257
4 or more risks	77.37	69.88	7.49	0.010	76.77	72.22	4.55	0.102	79.13	72.25	6.88	0.015	79.13	73.79	5.34	0.145
Less than 4 risks	88.12	79.58	8.54	0.025	86.19	83.52	2.67	0.466	88.36	82.92	5.44	0.145	88.36	86.16	2.20	0.655
Adverse home environment	79.51	76.92	2.59	0.704	82.57	72.31	10.26	0.113	87.14	73.08	14.06	0.025	87.14	68.75	18.39	0.032
No adverse home environment	80.41	72.22	8.19	0.001	78.79	75.87	2.92	0.227	80.90	75.49	5.41	0.029	80.90	77.82	3.08	0.341
B. 4-year college attendance, %																
Female	17.60	13.68	3.92	0.180	17.77	14.42	3.35	0.227	20.14	13.82	6.32	0.026	20.14	14.18	5.96	0.131
Male	11.33	7.60	3.73	0.117	10.30	9.46	0.84	0.719	10.35	9.70	0.65	0.791	10.35	13.08	-2.73	0.434
Mother completed HS	17.53	18.00	-0.47	0.885	19.05	15.73	3.32	0.276	20.22	15.87	4.35	0.155	20.22	13.38	6.84	0.096
Mother not completed HS	11.92	5.28	6.64	0.002	9.60	9.09	0.51	0.814	10.89	8.59	2.30	0.315	10.89	13.89	-3.00	0.380
4 or more risks	12.69	8.19	4.50	0.031	12.59	9.26	3.33	0.097	13.28	9.89	3.39	0.103	13.28	12.14	1.14	0.694
Less than 4 risks	20.08	16.20	3.88	0.343	18.57	18.75	-0.18	0.964	21.92	16.67	5.25	0.201	21.92	18.46	3.46	0.567
Adverse home environment	13.94	17.31	-3.37	0.571	17.43	10.77	6.66	0.230	17.14	13.46	3.68	0.506	17.14	9.37	7.77	0.298
No adverse home environment	14.82	9.72	5.10	0.011	13.68	12.15	1.53	0.431	15.50	11.53	3.97	0.049	15.50	14.22	1.28	0.655
C. BA or AA degree, %																
Female	11.38	10.68	0.70	0.779	12.59	9.29	3.30	0.163	13.78	9.45	4.33	0.074	13.78	7.09	6.69	0.040
Male	5.06	4.80	0.26	0.881	4.61	5.41	-0.80	0.638	4.31	5.31	-1.00	0.569	4.31	6.15	-1.84	0.443
Mother completed HS	11.01	13.00	-1.99	0.469	11.64	11.61	0.03	0.991	12.36	11.11	1.25	0.627	12.36	8.66	3.70	0.272
Mother not completed HS	5.96	3.87	2.09	0.210	6.07	4.11	1.96	0.231	6.45	4.50	1.95	0.262	6.45	4.86	1.59	0.516
4 or more risks	7.04	4.68	2.36	0.141	7.27	4.86	2.41	0.118	7.59	5.42	2.17	0.175	7.59	6.31	1.28	0.567
Less than 4 risks	12.30	14.79	-2.49	0.487	12.86	13.64	-0.78	0.822	14.38	12.50	1.88	0.597	14.38	7.69	6.69	0.167
Adverse home environment	8.20	5.77	2.43	0.574	9.08	4.62	4.46	0.265	8.57	6.73	1.84	0.652	8.57	6.25	2.32	0.683
No adverse home environment	8.50	7.87	0.63	0.701	8.72	7.73	0.99	0.535	9.66	7.47	2.19	0.185	9.66	6.69	2.97	0.184
D. SES ≥ 4, %																
Female	42.29	36.45	5.84	0.150	42.55	37.67	4.88	0.202	44.49	37.78	6.71	0.085	44.49	38.06	6.43	0.220
Male	29.16	22.61	6.55	0.077	26.73	26.52	0.21	0.954	30.29	24.68	5.61	0.141	30.29	28.83	1.46	0.786
Mother completed HS	44.72	39.89	4.83	0.274	43.98	42.08	1.90	0.648	45.14	41.86	3.28	0.432	45.14	43.36	1.78	0.753
Mother not completed HS	28.61	21.84	6.77	0.049	26.90	25.00	1.90	0.572	31.19	23.33	7.86	0.027	31.19	25.76	5.43	0.271
4 or more risks	32.79	24.06	8.73	0.006	32.56	26.13	6.43	0.034	35.98	26.12	9.86	0.002	35.98	27.65	8.33	0.051
Less than 4 risks	46.37	42.19	4.18	0.450	42.10	48.10	-6.00	0.236	43.94	45.37	-1.43	0.794	43.94	54.39	-10.45	0.187
Adverse home environment	27.77	24.44	3.33	0.670	29.90	21.43	8.47	0.252	30.15	24.44	5.71	0.433	30.15	22.22	7.93	0.438
No adverse home environment	37.72	29.82	7.90	0.008	35.95	33.60	2.35	0.414	39.46	32.24	7.22	0.015	39.46	35.32	4.14	0.309

Table S10. Unadjusted Means by Subgroups and Program Components (Continued)

Outcome and subgroup	Preschool				School-Age				Extended-1				Extended-2			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value
E. Average annual income																
Female	12467	11882	585	0.441	12392	12131	261	0.715	12807	11933	874	0.229	12807	12218	589	0.541
Male	10644	9607	1037	0.199	10157	10359	-202	0.798	11002	9845	1157	0.161	11002	10565	437	0.704
Mother completed HS	12957	12673	284	0.750	13003	12682	321	0.702	13247	12605	642	0.445	13247	12671	576	0.612
Mother not completed HS	10442	9393	1049	0.127	9866	10242	-376	0.575	10787	9652	1135	0.108	10787	10429	358	0.708
4 or more risks	10902	9441	1461	0.019	10693	10018	675	0.258	11546	9730	1816	0.003	11546	10208	1338	0.101
Less than 4 risks	13718	13883	-165	0.883	13084	14490	-1406	0.196	13188	14049	-861	0.439	13188	15691	-2503	0.125
Adverse home environment	10193	9922	271	0.869	10094	10137	-43	0.979	10738	9659	1079	0.481	10738	10152	586	0.789
No adverse home environment	11871	10820	1051	0.075	11557	11421	136	0.811	12220	11076	1144	0.051	12220	11616	604	0.445
F. Any food stamp participation ages 24-27, %																
Female	64.13	61.67	2.46	0.530	62.22	64.77	-2.55	0.491	64.00	62.86	1.14	0.762	64.00	68.22	-4.22	0.405
Male	31.37	31.67	-0.30	0.938	31.05	33.33	-3.28	0.373	26.89	34.15	-7.26	0.054	26.89	36.36	-9.47	0.066
Mother completed HS	45.27	37.50	7.77	0.070	42.55	43.36	-0.81	0.840	43.56	42.38	1.18	0.769	42.56	48.74	-5.18	0.346
Mother not completed HS	52.18	52.36	-0.18	0.963	50.52	54.32	-3.80	0.312	50.20	53.36	-3.16	0.421	50.20	56.49	-6.29	0.243
4 or more risks	51.26	50.15	1.11	0.744	49.18	53.13	-3.95	0.225	48.77	52.18	-3.41	0.304	48.77	55.44	-6.67	0.134
Less than 4 risks	41.88	36.96	4.92	0.349	39.90	40.24	-0.34	0.947	41.78	38.94	2.84	0.585	41.78	43.86	-2.08	0.788
Adverse home environment	50.00	45.65	4.35	0.620	48.51	49.09	-0.58	0.945	47.76	49.44	-1.68	0.836	47.76	50.00	-2.24	0.851
No adverse home environment	48.55	46.32	2.23	0.462	46.33	49.52	-3.19	0.275	46.64	48.43	-1.79	0.550	46.64	53.10	-6.46	0.114
G. Substance abuse (excluding alcohol), %																
Female	4.85	5.69	-0.84	0.626	5.78	4.29	1.49	0.361	5.93	4.63	1.30	0.437	5.93	4.80	1.13	0.626
Male	34.29	42.96	-8.67	0.019	36.74	38.63	-1.89	0.601	33.60	39.71	-6.11	0.103	33.60	36.96	-3.36	0.504
Mother completed HS	17.73	21.80	-4.07	0.214	17.63	20.92	-3.29	0.283	16.55	20.70	-4.15	0.174	16.55	21.05	-4.50	0.269
Mother not completed HS	20.12	27.88	-7.76	0.012	24.47	21.64	2.83	0.346	21.51	24.01	-2.50	0.430	21.51	19.87	1.64	0.691
4 or more risks	18.11	26.42	-8.31	0.002	21.45	20.39	1.06	0.673	18.77	22.27	-3.50	0.175	18.77	18.98	-0.21	0.948
Less than 4 risks	21.26	23.03	-1.77	0.678	20.46	23.66	-3.20	0.438	19.48	23.41	-3.93	0.351	19.48	25.00	-5.52	0.357
Adverse home environment	29.59	30.36	-0.77	0.918	31.53	27.14	4.39	0.529	31.43	28.83	2.60	0.710	31.43	28.57	2.86	0.764
No adverse home environment	17.33	24.84	-7.51	0.001	19.58	20.62	-1.04	0.642	17.12	21.73	-4.61	0.045	17.12	19.27	-2.15	0.474
H. Any felony charge, %																
Female	2.83	6.91	-4.08	0.011	4.09	4.29	-0.20	0.894	3.49	4.63	-1.14	0.448	3.49	2.06	1.43	0.407
Male	37.14	42.24	-5.10	0.171	39.17	38.94	0.23	0.949	37.50	39.92	-2.42	0.523	37.50	35.51	1.99	0.695
Mother completed HS	17.09	17.06	0.03	0.992	17.63	16.31	1.32	0.652	16.91	17.21	-0.30	0.918	16.91	15.79	1.12	0.775
Mother not completed HS	21.37	31.41	-10.04	0.002	25.18	25.48	-0.30	0.922	22.26	26.84	-4.58	0.160	22.26	20.53	1.73	0.679
4 or more risks	19.11	27.49	-8.38	0.002	22.11	21.91	0.20	0.937	19.28	23.60	-4.32	0.100	19.28	18.98	0.30	0.929
Less than 4 risks	19.68	21.05	-1.37	0.740	20.00	20.43	-0.43	0.914	20.13	20.24	-0.11	0.979	20.13	16.18	3.95	0.486
Adverse home environment	25.60	30.36	-4.76	0.507	26.12	28.57	-2.45	0.719	27.15	27.03	0.12	0.986	27.15	22.86	4.29	0.635
No adverse home environment	18.30	25.05	-6.75	0.004	20.84	20.62	0.22	0.924	18.39	22.10	-3.71	0.112	18.39	17.67	0.72	0.811

Table S11. Adjusted Means for Selected Adult Outcomes by Subgroups and Program Components

Outcome and subgroup	Preschool				School-Age				Extended-1				Extended-2			
	Interv	Comp		P	Interv	Comp	Diff.	p	Interv	Comp		P	Interv	Comp,	Diff.	P
			Diff.	Value				Value			Diff.	Value		PK + K		Value
A. High school completion, %																
Female	85.4	86.9	-1.5	0.592	89.3	80.8	8.5	0.022	88.8	83.6	5.2	0.043	88.0	81.6	6.4	0.065
Male	77.5	63.5	14.1	0.002	70.0	75.7	-5.8	0.096	75.6	70.4	5.2	0.241	74.0	79.7	-5.7	0.312
Mother completed HS	86.7	84.9	1.8	0.525	87.4	84.4	2.9	0.372	88.7	84.3	4.4	0.197	88.1	85.4	2.8	0.487
Mother not completed HS	76.8	66.0	10.8	0.002	72.8	72.7	0.1	0.972	77.1	70.3	6.8	0.020	75.4	74.1	1.3	0.754
4 or more risks	76.9	70.8	6.1	0.026	75.8	73.6	2.2	0.412	78.6	72.6	6.0	0.006	77.1	75.3	1.7	0.576
Less than 4 risks	90.7	80.0	10.7	0.003	87.0	87.8	-0.8	0.811	89.7	85.1	4.6	0.187	89.0	88.0	0.9	0.821
High neighborhood poverty	79.6	71.8	7.8	0.006	79.3	74.9	4.4	0.200	80.7	75.2	5.5	0.119	79.4	78.6	0.9	0.847
Low neighborhood poverty	84.4	78.6	5.7	0.097	81.7	82.3	-0.6	0.849	85.2	80.2	5.0	0.115	84.1	80.7	3.3	0.450
Adverse home environment	83.8	88.0	-4.1	0.501	88.8	77.4	11.4	0.034	90.5	80.3	10.2	0.065	90.2	77.7	12.5	0.028
No adverse home environment	81.9	74.1	7.8	0.004	79.1	79.5	-0.5	0.847	81.8	77.6	4.2	0.078	80.5	81.0	-0.5	0.881
Single parent	79.2	74.3	4.8	0.123	78.4	76.4	2.0	0.344	80.3	75.8	4.5	0.082	79.1	77.1	2.0	0.548
Not single parent	89.4	77.9	11.5	0.000	86.1	85.5	0.5	0.889	90.5	82.3	8.3	0.003	89.2	87.9	1.3	0.805
1 year CPC preschool	n.a.	n.a.	n.a.	n.a.	84.4	80.0	4.4	0.324	84.2	81.5	2.7	0.470	83.7	81.8	1.9	0.694
2 year CPC preschool	n.a.	n.a.	n.a.	n.a.	84.3	79.6	4.6	0.101	84.6	80.6	4.0	0.162	84.2	81.9	2.3	0.340
African American	80.4	74.9	5.5	0.030	79.3	77.5	1.9	0.431	81.8	76.5	5.3	0.021	80.5	78.1	2.4	0.464
Hispanic	98.9	92.9	6.0	0.004	97.9	97.5	0.4	0.750	99.5	95.0	4.5	0.011	99.5	96.3	3.2	0.054
B. SES ≥ 4, %																
Female	40.9	37.7	3.2	0.465	41.2	38.2	3.0	0.487	42.1	38.5	3.6	0.376	41.1	38.2	2.9	0.608
Male	28.4	20.8	7.6	0.082	25.4	25.4	0.1	0.984	30.0	23.0	7.0	0.004	29.4	25.6	3.8	0.368
Mother completed HS	42.5	40.6	1.9	0.633	43.7	39.5	4.2	0.196	43.4	40.9	2.4	0.556	43.1	39.1	4.0	0.409
Mother not completed HS	28.2	20.2	8.0	0.016	24.4	25.5	-1.1	0.784	30.1	22.6	7.5	0.051	28.6	26.5	2.1	0.631
4 or more risks	30.9	24.7	6.2	0.022	30.1	26.7	3.4	0.303	33.8	25.9	7.9	0.008	32.8	27.3	5.5	0.136
Less than 4 risks	48.6	37.6	11.0	0.065	41.5	48.1	-6.7	0.281	43.7	45.0	-1.3	0.797	42.5	49.3	-6.8	0.313
High neighborhood poverty	32.6	26.6	6.0	0.123	33.2	27.6	5.6	0.107	33.7	29.2	4.5	0.180	33.2	27.6	5.6	0.107
Low neighborhood poverty	37.1	29.3	7.8	0.132	32.0	35.3	-3.3	0.577	38.1	31.3	6.8	0.062	36.6	36.6	0.0	0.995
Adverse home environment	25.3	26.8	-1.5	0.853	29.7	20.1	9.7	0.269	29.5	23.6	5.8	0.477	27.7	20.1	7.6	0.502
No adverse home environment	35.4	29.1	6.4	0.026	32.7	33.6	-0.9	0.777	36.2	31.3	4.9	0.105	35.5	33.6	1.9	0.596
Single parent	31.5	25.1	6.4	0.041	30.3	27.8	2.5	0.498	34.3	26.4	7.8	0.009	33.5	27.5	6.1	0.126
Not single parent	45.2	39.6	5.6	0.282	42.2	44.4	-2.2	0.714	41.7	43.8	-2.2	0.678	40.0	46.8	-6.8	0.321
1 year CPC preschool	n.a.	n.a.	n.a.	n.a.	35.9	30.7	5.2	0.436	35.3	32.9	2.4	0.702	35.0	30.9	4.2	0.560
2 year CPC preschool	n.a.	n.a.	n.a.	n.a.	36.1	35.0	1.1	0.763	36.8	34.3	2.5	0.556	36.7	35.1	1.6	0.688
African American	32.1	27.6	4.5	0.112	30.5	30.4	0.1	0.982	33.0	29.0	4.0	0.136	32.2	29.8	2.4	0.510
Hispanic	66.5	67.0	-0.5	0.946	82.2	45.6	36.6	0.005	83.3	50.0	33.3	0.015	80.1	48.9	31.3	0.031

Table S11. Adjusted Means for Selected Adult Outcomes by Subgroups and Program Components (Continued)

Outcome and subgroup	Preschool				School-Age				Extended-1				Extended-2			
	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value	Interv	Comp	Diff.	P Value
C. Substance abuse (excluding alcohol), %																
Female	3.9	4.8	-1.0	0.601	4.9	3.4	1.6	0.453	5.3	3.5	1.7	0.357	5.2	3.8	1.4	0.646
Male	33.7	42.9	-9.2	0.002	37.3	36.7	0.6	0.878	32.7	39.5	-6.7	0.135	33.5	37.7	-4.2	0.501
Mother completed HS	12.6	12.6	0.0	1.000	11.0	15.1	-4.0	0.226	11.1	13.9	-2.7	0.425	11.1	16.3	-5.2	0.183
Mother not completed HS	13.5	23.0	-9.4	0.000	19.4	14.1	5.3	0.087	15.9	17.8	-2.0	0.607	16.6	13.0	3.5	0.539
4 or more risks	13.2	20.7	-7.4	0.000	17.2	13.8	3.4	0.207	14.8	16.4	-1.6	0.616	15.1	13.4	1.7	0.695
Less than 4 risks	15.1	15.8	-0.7	0.878	13.1	18.4	-5.3	0.193	13.2	17.1	-3.9	0.292	13.7	21.2	-7.5	0.150
High neighborhood poverty	12.8	22.1	-9.2	0.001	16.0	13.7	2.3	0.496	13.9	16.3	-2.4	0.537	14.0	13.1	0.9	0.869
Low neighborhood poverty	15.0	15.7	-0.7	0.808	14.7	16.0	-1.3	0.626	14.3	15.8	-1.6	0.669	14.8	18.6	-3.8	0.390
Adverse home environment	14.8	24.0	-9.2	0.264	18.7	14.9	3.8	0.651	15.3	19.2	-3.9	0.610	15.4	13.8	1.6	0.889
No adverse home environment	12.5	17.6	-5.0	0.018	14.8	13.5	1.3	0.630	13.1	15.0	-2.0	0.514	13.3	14.4	-1.0	0.816
Single parent	13.2	18.1	-4.9	0.034	16.2	13.2	3.0	0.243	13.9	15.4	-1.5	0.606	14.4	14.8	-0.4	0.924
Not single parent	14.2	19.9	-5.7	0.227	14.1	19.0	-4.9	0.321	15.3	17.3	-2.0	0.645	14.9	16.0	-1.1	0.881
1 year CPC preschool	n.a.	n.a.	n.a.	n.a.	14.2	14.1	0.0	0.998	15.6	12.5	3.1	0.310	15.6	14.0	1.6	0.666
2 year CPC preschool	n.a.	n.a.	n.a.	n.a.	11.6	14.9	-3.3	0.483	12.5	12.5	0.0	0.996	12.5	14.6	-2.2	0.639
African American	14.1	0.0	-5.2	0.012	16.3	15.2	1.1	0.704	14.4	16.7	-2.3	0.404	14.8	16.4	-1.6	0.714
Hispanic	3.8	0.7	3.1	0.303	1.6	4.0	-2.4	0.338	5.1	1.4	3.7	0.026	4.6	0.2	4.4	0.294
D. Any felony charge, %																
Female	2.0	6.1	-4.1	0.005	3.4	2.6	0.8	0.486	3.1	4.8	-1.7	0.478	2.8	0.9	1.9	0.398
Male	36.5	42.1	-5.6	0.172	39.1	37.9	1.2	0.725	19.5	21.8	-2.3	0.392	37.6	36.1	1.5	0.792
Mother completed HS	10.9	9.7	1.1	0.661	10.3	10.7	-0.4	0.840	11.8	13.7	-2.0	0.403	10.9	9.8	1.1	0.747
Mother not completed HS	13.9	25.2	-11.4	0.000	18.7	16.9	1.8	0.446	15.0	17.0	-2.0	0.403	15.6	12.9	2.7	0.544
4 or more risks	13.1	20.8	-7.7	0.000	16.5	14.4	2.1	0.268	13.7	15.5	-1.8	0.468	14.3	12.1	2.2	0.446
Less than 4 risks	12.2	13.0	-0.8	0.863	11.9	13.3	-1.4	0.637	14.3	16.1	-1.8	0.468	13.6	11.1	2.5	0.590
High neighborhood poverty	13.3	22.3	-9.1	0.004	16.4	14.1	2.2	0.349	13.7	15.3	-1.6	0.484	14.6	12.4	2.1	0.591
Low neighborhood poverty	12.1	13.5	-1.4	0.692	11.9	13.7	-1.8	0.529	13.3	14.9	-1.6	0.484	11.5	11.3	0.2	0.970
Adverse home environment	11.7	19.5	-7.8	0.276	11.8	17.2	-5.4	0.340	12.9	14.2	-1.3	0.582	12.1	6.3	5.8	0.423
No adverse home environment	11.6	16.7	-5.1	0.039	14.5	12.0	2.5	0.206	12.7	13.9	-1.1	0.635	12.7	10.9	1.8	0.530
Single parent	13.2	18.3	-5.1	0.043	15.7	13.9	1.8	0.337	13.6	15.7	-2.1	0.430	14.0	13.3	0.7	0.801
Not single parent	10.7	15.4	-4.7	0.186	11.6	13.1	-1.5	0.643	13.5	12.0	1.4	0.692	13.1	6.3	6.8	0.243
1 year CPC preschool	n.a.	n.a.	n.a.	n.a.	16.5	10.7	5.8	0.007	17.5	11.2	6.3	0.008	17.4	10.5	6.9	0.005
2 year CPC preschool	n.a.	n.a.	n.a.	n.a.	8.0	9.8	-1.8	0.514	7.8	9.5	-1.7	0.572	7.9	9.8	-1.9	0.540
African American	12.7	17.9	-5.2	0.030	15.0	13.7	1.4	0.490	13.6	15.1	-1.6	0.530	13.8	11.8	1.9	0.536
Hispanic	1.8	2.6	-0.8	0.719	0.9	5.3	-4.4	0.007	0.6	4.9	-4.3	0.000	0.7	4.6	-3.9	0.097

Note. Adjusted for gender, race, individual risk indicators (birth to 3), and child welfare history by age 4. Sample sizes vary by measures.

Table S12. Adjusted Means with IPW Attrition Correction and Robust Standard Errors for Adult Outcomes by Age 28 (Dosage of Program Components)

Outcome	Preschool ¹				School-Age ²				Extended-1 ³				Extended-2 ⁴			
	2-year	1-year	Diff.	P Value	2 or 3-year	1 year	Diff.	p Value	5 or 6-year	4-year	Diff.	P Value	5 or 6-year	4 year	Diff.	P Value
Educational Attainment																
On time graduation, %	36.1	40.4	-4.2	0.273	41.5	28.5	13.0	0.025	47.4	42.0	5.4	0.214	46.3	44.1	2.2	0.593
High school completion, %	81.7	83.3	-1.7	0.589	81.1	83.5	-2.4	0.488	84.3	83.7	0.6	0.877	84.2	84.0	0.2	0.964
Highest grade completed	12.1	12.2	-0.1	0.190	12.1	12.1	0.0	0.782	12.3	12.2	0.0	0.925	12.2	12.3	0.0	0.833
College attendance, %	33.9	33.2	0.7	0.856	35.1	30.1	5.0	0.103	37.4	35.0	2.4	0.606	37.6	34.7	2.9	0.542
4-year college attendance, %	13.6	12.8	0.8	0.702	12.2	11.0	1.2	0.633	13.2	14.9	-1.8	0.630	12.3	15.5	-3.2	0.401
BA or AA degree, %	5.7	9.0	-3.3	0.011	6.9	7.4	-0.4	0.827	6.8	7.6	-0.8	0.737	6.9	8.1	-1.2	0.653
Socioeconomic Status																
Occupational prestige composite (1-8)	2.8	2.8	0.0	0.636	2.8	2.6	0.2	0.148	2.9	2.8	0.1	0.496	2.9	2.8	0.5	0.754
Occupational prestige ≥ 4, %	28.6	29.1	-0.5	0.836	26.4	22.9	3.5	0.338	30.4	28.4	2.1	0.688	29.6	29.6	0.1	0.988
SES composite (0-8)	3.0	3.0	0.0	0.778	3.0	2.8	0.2	0.144	3.3	3.1	0.3	0.227	3.3	3.0	0.2	0.319
SES ≥ 4, %	34.5	35.7	-1.3	0.746	33.1	30.9	2.2	0.484	38.3	32.2	6.1	0.107	38.3	32.2	6.1	0.090
AA or BA or employed 8+ quarters, %	44.7	47.4	-2.7	0.443	44.6	43.0	1.7	0.721	47.8	46.8	1.1	0.840	47.9	46.6	1.3	0.814
Average annual income, (\$)	11,394	11,980	-586	0.919	11,545	10,413	1,132	0.780	12,328	11,166	1,162	0.435	11,394	11,980	-586	0.919
Average annual income 14K or higher, %	32.3	33.4	-1.1	0.746	31.5	30.4	1.1	0.814	36.1	28.1	8.0	0.027	32.3	33.4	-1.1	0.746
Full-time employment (8 or more quarters), %	28.5	31.7	-3.1	0.300	33.9	28.3	5.6	0.393	33.2	25.6	7.6	0.122	33.1	25.8	7.3	0.134
Public Aid																
Ages 18-23																
Any food stamp participation, %	54.1	56.1	-2.0	0.489	55.4	54.0	1.4	0.804	53.9	58.6	-4.7	0.422	54.3	57.5	-3.2	0.595
2 or more years participation in food stamp, %	19.9	19.7	0.2	0.957	18.7	19.5	-0.8	0.835	18.1	19.4	-1.4	0.803	18.2	18.9	-0.7	0.898
Any TANF participation, %	20.3	19.5	0.8	0.789	19.1	20.9	-1.8	0.710	20.6	17.5	3.1	0.360	20.8	16.8	4.0	0.271
2 or more years participation in TANF, %	7.7	8.3	-0.6	0.729	7.8	5.0	2.8	0.231	8.6	8.8	-0.2	0.929	8.7	8.3	0.4	0.818
Ages 24-27																
Any food stamp participation, %	48.5	47.4	1.1	0.764	45.1	44.7	0.4	0.928	45.9	45.9	-0.1	0.990	46.2	45.0	1.2	0.788
2 or more years participation in food stamp, %	17.0	15.0	2.0	0.406	16.4	15.5	1.0	0.818	15.5	14.1	1.4	0.753	15.6	13.1	2.5	0.566
Any TANF participation, %	4.7	3.7	0.9	0.448	2.5	1.4	1.1	0.223	9.5	4.5	5.1	0.076	10.2	3.9	6.3	0.081
2 or more years participation in TANF, %	1.8	1.1	0.7	0.331	1.8	1.2	0.6	0.478	1.3	1.2	0.1	0.910	2.1	2.3	-0.1	0.913
Health Status and Behavior																
Any insurance, %	76.6	74.9	1.7	0.604	73.9	68.9	5.0	0.293	79.9	71.7	8.2	0.107	80.2	71.2	9.1	0.068
Any public insurance, %	26.8	24.2	2.7	0.410	21.2	30.7	-9.4	0.018	23.8	16.0	7.8	0.190	24.1	14.9	9.2	0.155

Table S12. Adjusted Means with IPW Attrition Correction and Robust Standard Errors for Adult Outcomes by Age 28 (Dosage/Program Components) (Continued)

Outcome	Preschool ¹				School-Age ²				Extended-1 ³				Extended-2 ⁴			
	2-year	1-year	Diff.	P Value	2-year	1-year	Diff.	P Value	2-year	1-year	Diff.	P Value	2-year	1-year	Diff.	P Value
Any private insurance, %	49.6	48.7	0.8	0.735	49.0	38.5	10.5	0.003	54.3	48.0	6.3	0.259	54.2	48.2	6.0	0.288
Substance abuse (excluding alcohol) , %	13.9	13.7	0.2	0.951	16.4	11.7	4.6	0.136	15.6	11.0	4.6	0.226	15.7	10.3	5.5	0.135
Drug and alcohol abuse, %	15.4	16.6	-1.2	0.716	18.3	13.0	5.3	0.12	16.7	12.6	4.2	0.284	16.9	11.6	5.4	0.157
Crime and Justice System Involvement																
Any adult arrest (include self-report), %	46.5	48.5	-2.0	0.599	51.9	48.9	2.9	0.513	46.4	56.5	-10.1	0.071	46.5	56.2	-9.8	0.065
Any violent charge, %	14.1	19.3	-5.2	0.019	16.3	23.1	-6.8	0.005	13.4	20.8	-7.4	0.002	14.1	19.3	-5.2	0.019
Number of adult arrests	1.7	1.7	0.0	0.976	1.6	1.9	-0.3	0.4	1.5	1.7	-0.2	0.291	1.5	1.7	-0.2	0.353
Any felony charge, %	10.6	13.3	-2.7	0.277	14.2	13.4	0.8	0.738	10.8	15.8	-4.9	0.113	10.9	15.4	-4.5	0.120
Number of felony charges	0.4	0.5	-0.1	0.389	0.5	0.5	0.0	1.0	0.4	0.5	-0.1	0.332	0.4	0.5	-0.1	0.521
Ever incarcerated or jail (include self-report), %	13.8	16.2	-2.4	0.397	16.5	17.9	-1.4	0.611	13.4	16.3	-2.9	0.310	13.4	16.2	-2.8	0.279
Family Status																
Age at birth of first child	19.5	19.3	0.2	0.355	19.4	19.3	0.1	0.877	19.6	19.2	0.5	0.166	19.6	19.2	0.4	0.251
Parenthood, %	65.5	61.0	4.5	0.268	65.7	63.7	2.0	0.785	66.5	61.8	4.7	0.384	67.5	60.4	7.1	0.216
Number of children	1.2	1.2	0.0	0.962	1.3	1.2	0.0	0.822	1.2	1.3	-0.1	0.634	1.2	1.3	0.0	0.821
Had 3 or more children, %	14.5	14.6	-0.1	0.980	16.0	14.9	1.2	0.783	14.9	18.6	-3.7	0.431	14.9	18.3	-3.4	0.482
If married or living with partner, %	24.1	25.6	-1.5	0.666	25.1	26.4	-1.3	0.757	23.7	26.3	-2.6	0.532	23.7	26.3	-2.6	0.542

- Note. 1. Adjusted for school-age participation, 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. School poverty among the 8 indicators of risk status was replaced with neighborhood poverty at 1980. Home environment at ages 0-5 was included. Robust standard errors were used. Inverse probability weighting (IPW) of being in the study sample was created, and was used as a sampling weight in the model to adjust for attrition. Sample sizes vary by measures.
2. Adjusted for CPC preschool participation, 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. School poverty among the 8 indicators of risk status was replaced with neighborhood poverty at 1980. Home environment at ages 0-5 was included. Robust standard errors were used. IPW of being in the study sample was created, and was used as a sampling weight in the model to adjust for attrition. Sample sizes vary by measures.
3. Adjusted for 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, and a dummy-coded variable for missing data on risk status. School poverty among the 8 indicators of risk status was replaced with neighborhood poverty at 1980. Home environment at ages 0-5 was included. Robust standard errors were used. IPW of being in the study sample was created, and was used as a sampling weight in the model to adjust for attrition. Sample sizes vary by measures.
4. Adjusted for 8 indicators of preprogram risk status, sex of child, race/ethnicity, child welfare history by age 4, Iowa Tests of Basic Skills word analysis scores at the end of kindergarten, and a dummy-coded variable for missing data on risk status. School poverty among the 8 indicators of risk status was replaced with neighborhood poverty at 1980. Home environment at ages 0-5 was included. Robust standard errors were used. IPW of being in the study sample was created, and was used as a sampling weight in the model to adjust for attrition. Sample sizes vary by measures.

Table S13. Main Effects of Selected Outcomes for Three Measures of CPC Participation and the Percentage Reduction in Effects Associated with Five Hypotheses of Mediation

Adult outcome	Preschool		School-Age		Extended-1	
	Main effect	% Reduction	Main effect	% Reduction	Main effect	% Reduction
On time graduation, %	9.6	100	7.9	25.5	12.1	73.6
High school completion, %	7.6	100	--	--	6.6	100
SES \geq 4, %	7.1	99	--	--	6.9	38.2
Average annual income in 2007 dollars (log)	786 (0.41)	64.7	--	--	--	--
Substance abuse (excluding alcohol), %	-6.5	59.8	--	--	--	--
Any felony charge, %	-6.4	100	--	--	--	--
Strongest predictors of adult outcomes	ITBS reading score, age 14		School quality, ages 10 to 14		ITBS cognitive composite, age 5	
	Juvenile arrest		Juvenile arrest		Juvenile arrest	
	High school completion by age 21		High school completion by age 21		High school completion by age 21	

Note. Five-Hypothesis Model included indicators for cognitive advantage, family support, social adjustment, motivational advantage and school support measures from ages 5 to 21 (see also Table S14). ITBS = Iowa Tests of Basic Skills, standard scores. Extended-1 = Extended intervention group with 4 to 6 years of services versus fewer years.

Table S14. Standardized Coefficients for Models in which CPC Program Participation Predicts Mediators and the Mediators Predict Selected

Mediators	Direct effects of CPC participation			Predictors of adult outcomes					
	Preschool	School-age	Extended interv-1	On-time graduation	High school completion	SES \geq 4	Average annual income (log)	Substance abuse (excluding alcohol)	Any felony charge
ITBS cognitive composite, age 5	.276	NA	NA	.008	.005	.004	X	X	-.004
Special education or retention by age 15	-.120	-.104	-.146	-.420	-.210	-.188	-.114	.124	.156
ITBS reading score, age 14	.150	.099	.164	.010	.006	.007	.228	-.004	-.005
High school completion by age 21	.134	X	.098	--	.529	.468	.342	-.256	-.283
Social adjustment, ages 7-9	.133	.091	.165	.041	.026	.032	.192	-.016	-.023
Trouble making behavior, ages 9-12	-.078	X	-.072	-.156	-.082	-.142	-.226	.121	.141
Juvenile arrest	-.086	X	X	-.370	-.236	-.324	-.350	.377	.461
Motivation, ages 5-6	.127	NA	NA	.145	.087	.110	.137	-.060	-.060
School commitment, ages 11-12	.100	.085	.133	.103	.056	.099	.166	-.069	-.078
Child abuse and neglect, ages 4-12	-.031	X	-.040	-.225	X	-.221	-.092	.138	.179
Parent involvement in school, ages 7-12	.148	.235	.318	.093	.059	.053	.137	-.042	-.046
School mobility, ages 10-14	-.118	-.123	-.187	-.172	-.084	-.092	-.127	.088	.107
School quality, ages 10-14	.093	.101	.144	.267	.171	.167	.097	-.115	-.118

Note. Summary of results for the models are reported in Table S13. Coefficients denote the change outcome (mediator or adult outcome) associated with a 1 standard deviation change in the predictor (CPC program or mediator) controlling for covariates and in the case of the adult outcomes, program participation and the other mediators. Mediators are indicators in the Five-Hypothesis Model (5HM) of Intervention Effects and include cognitive advantage, family support, social adjustment, school motivational advantage, and school support domains. Mediators were tested with program components and outcomes independently.

All listed standardized coefficients are significant at 0.01 level. X = not significant at the .05 level. NA = not applicable (mediator not measured after program participation).