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The Impact of the Home Instructional Program for Preschool Youngsters (HIPPY) on School Performance in 3rd and 6th Grades

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A post hoc matching design was used to compare children who participated in the Home Instructional Program for Preschool Youngsters (HIPPY) throughout Arkansas to children from the same classrooms who had no preschool experience and children who had other preschool experiences in the third and sixth grades. The program showed modest positive impact on school suspensions, grades, classroom behavior, and achievement test scores at both grade levels.

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HIPPY Evaluation

The Impact of the Home Instructional Program for Preschool Youngsters (HIPPY) on School Performance in 3rd and 6th Grades

For more than two decades there have been extensive efforts to improve the well-being and school readiness of high-risk children using home visiting programs. However, evaluations of home visitation programs have shown only modest success (Gomby, Cubross, Behrman, et al., 1999; Ramey & Ramey, 1998; Weiss, 1993). In their recent review of studies on home visitation, Gomby and her associates (1999) concluded that, when children's academic performance was measured, improvements in children's well-being were the exception more often than the rule. They also acknowledged that strong conclusions were difficult to draw in view of the diversity of home visitation models, inconsistencies in the measures used to assess children's behavioral development, uncertainties about the fidelity of implementation, and major problems with attrition. Most of the evaluation studies were also conducted only at one or two sites, and few, other than evaluations done on the nurse home visitation program designed by Olds and his colleagues (1998), have followed children beyond the first grade.

The purpose of this study was to determine the impact of the Home Instructional Program for Preschool Youngsters (HIPPY) on school performance during third and sixth grades. HIPPY is a home-based early childhood education program for parents of three-, four-, and five-year-old children. Its aim is to create greater continuity between home and school by enhancing the home learning environment prior to school entry. HIPPY involves the use of paraprofessionals as home-based educators. These individuals are frequently from the community. Each HIPPY educator is supervised by a HIPPY coordinator. The program involves the use of an age-appropriate standard curriculum consisting of nine story books and a series of accompanying materials. The activities are written in a structured format similar to a teacher's lesson plan. The purpose of the structure is to provide guidance to parents and to help ensure a successful learning experience for parents and children. The program is primarily cognitive-based, with materials designed to help children learn appropriate language, sensory and perceptual discrimination, visual motor, and problemsolving skills. All materials are provided without cost to participating families. The program runs 30 weeks each year, a period roughly coinciding with a school year. Home-based educators visit participating parents in their homes or at a parent group meeting each week. During each visit they elicit feedback from the parent regarding the previous week's activities, answer questions, provide information about upcoming HIPPY events, and role-play the next week's activities. The home visits typically last between 45 and 60 minutes. The focus of the visit is on the parent and getting them ready to conduct the lesson with their child during the following week. Sometimes children are not present during the visit. The intent is for participating parents to work with their children using the HIPPY materials and activities at least 15 minutes daily. Although HIPPY home educators make informal checks on parents regarding their use of the lessons with their children each week, there is no specific documentation of how frequently each parent actually works with the child. On alternate weeks, there are organized group meetings with parents and home-based educators led by professional HIPPY staff members. During the group meetings, parents are introduced to the next week's activity packets, have opportunities to meet with other parents, share concerns, ask questions, participate in discussions about child management, participate in enrichment activities, and from time-to-time hear presentations from local school personnel. There

have been several studies done of HIPPY, the most notably by Baker, Piotrkowski, and Brooks-Gunn (1999). Baker and her colleagues conducted studies on two cohorts (N = 182) of children from New York. For Cohort I they randomly assigned children to HIPPY and notreatment control conditions. They found significant group differences in both classroom adaptation (second grade) and achievement test performance (first grade) favoring HIPPY children . However, the findings were not replicated in the Cohort II where HIPPY children were compared to children who participated in a high quality prekindergarten program - this latter study did not involve random assignment. They conducted a similar study in Arkansas, albeit with a non-random control group, and obtained similar results. HIPPY children outperformed comparison children in the first cohort but not the second. Bradley and Whiteside-Mansell (1995) found that HIPPY children obtained better grades in school and performed somewhat better on standardized achievement tests than within-classroom matched children who had no formal preschool experience. HIPPY children were also rated by their teachers as having more appropriate classroom behavior. These differences, although statistically significant, were not large. Likewise, Bahe and Passe (1998) found that HIPPY children in the Minneapolis Public Schools were rated as being more proficient in school related behavior than children who had participated in other preschool programs. Overall, these findings suggest modest, albeit somewhat inconsistent, effects for HIPPY during the first two years of school.

HIPPY USA (www.c3pg.com/hippyusa.htm) describes a number of relatively informal evaluations of HIPPY programs throughout the United States. Taken as a whole, these studies suggest positive impacts on academic performance and classroom behavior. However, most of the studies are of brief duration, involve relatively small samples from single program sites, and employ little (if any) controls when analyzing results. There is only one randomized trial and that one involved few children and followed them only into second grade. In effect, it remain unclear whether the program has the hypothesized set of impacts envisioned by program developers, especially impacts beyond the primary grades. The current study examines the impact of the program for a large number of children selected from across the state of Arkansas. The study addresses a wide array of outcomes (grades, achievement test scores, school attendance, suspension, classroom behavior) and follows children through sixth grade.

The state of Arkansas began implementing HIPPY programs in the late 1980s. By 1990 the state had an infrastructure, Arkansas HIPPY, in place for providing the necessary training and supervision of HIPPY educators to allow for expansion of the program throughout the state. During the early 90s the state implemented the Arkansas Better Chance program, which included HIPPY as one of three primary options for low income children. Although Head Start expanded during the 90s, the state felt the need to provide additional educational services for low-income families given that Head Start services were not available to the majority of potentially eligible children. The number of HIPPY program sites continued to expand through the mid-90s as a result of ABC funding, using the training, supervision, materials development, and materials dissemination capacity of Arkansas HIPPY. Arkansas HIPPY manages HIPPY coordinators throughout the state as well as conducts state-wide training and information gathering activities. Because of the broad presence of HIPPY programs in the state and the state-wide infrastructure managed by Arkansas HIPPY, it became feasible to conduct a broad-based review of the impact of HIPPY on Arkansas children state-wide.

HIPPY Evaluation

A second purpose of this study is to compare the impact of participation in HIPPY to participation in preschool for low income children. There have been two examinations of this issue, one involving a single preschool setting (Baker et al., 1999), the second in a single community (Bradley & Whiteside-Mansell, 1997). Neither followed children beyond second grade and one focused on an enriched, high-quality education setting as the comparison condition. Although both studies found little difference between HIPPY and preschool education in regards to student achievement, neither study had high ecological validity. That is, neither study compared HIPPY (or other home visitation programs) as generally implemented to participation in preschool as generally implemented. Thus, neither provides an effective test of the idea that working with families may have longer-term benefits for children's school performance than attendance at preschool. Unlike attendance at preschool, participation in home visitation is assumed to have both immediate impacts on children through improving their school readiness and continuous impacts on children because it improves the way families interact with children and supports their learning through childhood.

Methods

Study Design

The study employed a quasi-experimental evaluation design involving within-classroom matching of HIPPY children with children who are demographically similar but who did not participate in HIPPY. A "post hoc" within-classroom matching design was used because a true experimental design (i.e., one involving random assignment of 3- and 4-years olds to HIPPY, other formal preschool, and no formal preschool groups) was neither ethically, politically, or fiscally feasible. Early childhood experts in Arkansas selected HIPPY as a potentially cost-efficient way of improving the school readiness of low-income children when it was determined that the majority of low-income children in the state did not have access to high-quality early education programs such as Head Start. The HIPPY program was selected because of its conceptual underpinnings and evidence that it was effective in improving school readiness of poor children in Israel. It was determined to establish HIPPY programs in communities throughout the state and to make the program available to as many low income families as possible in those communities. Given the decision to make the program available to all who were eligible and wanted the service, matching HIPPY children with current classmates on the basis of sex, race, age, and economic status appeared the most realistic way of estimating the impact of the HIPPY program in that these demographic factors tend to be strongly related to children's school performance. Nonetheless, controlling for these demographic factors does not mean that HIPPY children (or their families) were like children from the other two groups in all other respects. It is always possible that HIPPY children or HIPPY families may differ from comparison children or families in other ways that affect the children's performance in school. Of particular concern was parental motivation to seek educational programs for their children. For this reason, it was decided that matches for HIPPY children would include children who had preschool experience: the assumption being that parents who placed their children in preschool had similar motivations to parents who participated in HIPPY. Granting this effort to reduce the potential impact of selection bias, any conclusions drawn from this study should be made with caution, knowing the potential limitations of the post-hoc matching design.

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Sample

At each of 21 Arkansas HIPPY sites with programs begun in the early 1990s, program coordinators were asked to randomly select 20% of the children who were in the program during two academic years (1991-92 and 1994-95) and who had completed at least one year of the HIPPY program. Most of the children who attended during 1991-92 were sixth graders in 1998-99 (those few retained were in the 5th grade). Most of the children who attended in 1994-95 were third graders in 1998-99 (those retained were in the 2nd grade). Children selected from these 21 HIPPY program sites from around the state of Arkansas were being served in 81 school districts at the time of post-assessment. The sample used in the analyses consisted of 1032 children: 516 HIPPY children and 516 matched comparison children. Matching was done within the HIPPY child's current 3rd or 6th grade classroom on the basis of sex, race, age (in months) and free-lunch qualifications with the exception of HIPPY children from the two age cohorts who had been retained. For children retained, matching was done with either 5th or 2nd grade classrooms - most often matching children were younger. The sample was 54.6% male, 32.2% African American, 65.2% European American. Post-hoc analysis indicated that 82.8% of comparison children had no preschool experience, 17.2% had some preschool experience other than HIPPY.

Data were obtained from 384 other children, but either the degree of match between a HIPPY and a non-HIPPY child was insufficient or the amount of data available on a particular child was insufficient to keep the child in the analyses. Incomplete data was most often the reason for not including a child in the analysis sample (N = 311). Comparisons were made between the 384 cases not included in the analysis sample and the 1032 cases included on the demographic variables used for matching. There were no differences except for race. A slightly higher percentage of African Americans were omitted and it was often difficult to find a match for children who were neither European American nor African American (about 3% of the sample). It was also determined that 3 school districts had disproportionately high levels of incomplete data.

Measures

This evaluation focused exclusively on student outcomes in 3rd and 6th grades. Five categories of outcomes were examined: 1) school attendance, 2) official actions taken by the school district that affect the student's experience in school (i.e., suspension, use of special education services), 3) classroom grades in reading, math, and language arts, 4) standardized achievement test scores (the Stanford-8 achievement test battery was used throughout the state of Arkansas during 1998-99), and 5) student behavior. Historically, evaluators of prekindergarten programs have also used retention in grade and use of Title I services as indicators of program success. However, the matching design used in this study made impossible to accurately estimate retention rates for non-HIPPY children; and the movement to schoolwide Title I services in Arkansas meant utilization of Title I services at the individual child level a meaningless indicator. Information on the first 4 categories was available through school records. Information about school behavior was obtained from the child's classroom teacher. Teachers rated each child on a 11-item scale designed to assess student behavior in school. Each item was rated on a 5-point Likert scale. The items were adapted from a longer scale, the Child Classroom Adaptation Inventory, developed by Halpern, Baker, and Pjotrkowski (1993). The items used as part of this evaluation were the following: (#1) Enjoyment of books and reading, (#2) Listening and paying attention, (#3) Task orientation, (#4) Self-direction in learning, (#5) Seeking and using assistance, (#6) Curiosity, (#7) Initiative, (#8) Interest in school work, (#9) Ability to get along with peers, (#1 0) Overall adjustment, and (#1 1) Overall academic performance. Items #1, #2, and #8 were direct targets of HIPPY activities; thus, there was reason to believe that HIPPY children would show strength in these areas. Items #3, #4, #7, and #8 were indirect targets of HIPPY experiences (i.e., it was assumed that by improving children's basic skills and making them more comfortable with structured learning activities, they would develop the kinds of supportive capacities and interests identified in the 4 items); thus, there was reason to believe that HIPPY children would show strength in these areas. Items #5, #6, and #9 were not targets of the HIPPY program. Nonetheless, they were included as a check of an overall "halo effect" (i.e., teachers would rate children generally better because of their superior academic performance) and as a sign of broad selection bias present in the sample.

Results

Prior to analysis, all data were reviewed to determine if values entered into the data set were out-of-range for a particular measure or were otherwise suspicious. No such values were found.

School Attendance. Children in the HIPPY, Other Preschool, and No Preschool groups were compared on the number of days absent from school during the 1998-99 academic year. As expected, the data on attendance were markedly skewed due to the fact that only a small number of children missed 20 or more days whereas one child missed a total of 133 days. A minority of students missed more than 10 days during the year. The mean score for all three groups was approximately five days. The mean scores for the three groups were compared using analysis of variance (ANOVA). That analysis showed no significant difference between groups in terms of student absenteeism.

School Suspension. Children in HIPPY, Other Preschool, and No Preschool groups were compared in terms of the number of children suspended during the school year. Information was gathered on both suspensions during the current year and suspensions during previous years. For the 1998-99 school year, about 5.6% of the children with Other Preschool experience had been suspended, compared to 1.4% of HIPPY children, and 2.8% of children with No Preschool experience. A χ^2 analysis indicated a significant difference between the proportion of children from HIPPY who had been suspended. There was a similar pattern of suspensions for previous years. About 1.9% of HIPPY children had been suspended, compared to 2.8% of children with No Preschool experience, and 9.0% of children with Other Preschool experience. Again, a χ^2 analysis indicated a significant difference between the proportion of children with No Preschool experience, and 9.0% of children with Other Preschool experience. Again, a χ^2 analysis indicated a significant difference between the proportion of children with No Preschool experience, and 9.0% of children with Other Preschool experience. Again, a χ^2 analysis indicated a significant difference between the proportion of children with Other Preschool experience who had been suspended and the proportion of children with Other Preschool experience had been suspended and the proportion of children with Other Preschool experience between the proportion of children with Other Preschool experience who had been suspended and the proportion of children with Other Preschool experience who had been suspended and the proportion of children with Other Preschool experience who had been suspended and the proportion of children with Other Preschool experience who had been suspended and the proportion of children with Other Preschool experience who had been suspended and the proportion of children with Other Preschool experience who had been suspended and the proportion of children with Other Preschool experience

Special Education. Children from the HIPPY, Other Preschool, and No Preschool groups were compared in terms of the number of children who had active placements in special education. About 6.8% of children from the No Preschool group had such placements, compared to 4.8% for HIPPY and 4.5% for Other Preschool. Although the trend suggests a slightly higher proportion of special education placements for the No Preschool group, a χ^2 analysis showed no statistically significant differences between groups.

Classroom Grades. For each student, final grades for the year were obtained in three subject matter areas: Reading, Math, and Language Arts. These grades were converted to the traditional 4-point system (A = 4, B = 3, C = 2, D = 1, F = 0: all As would compute to a 4.00 grade-point average) for purposes of analysis. Table I shows the means, standard deviations, and effect sizes for grades in Reading, Math, and Language Arts. HIPPY students performed better than students in the other two groups in Reading and Language Arts. HIPPY students performed better than students with No Preschool experience in Math as well but there was not a statistically significant difference in Math performance between HIPPY students and students with Other Preschool experience. Although there were differences in grade point averages between HIPPY students and students in the other two groups, the effect sizes were only modest (d = .08 to .28).

Achievement Test Scores. Children's NCE (normal curve equivalent) scores on the Reading, Math, and Language Arts components of the Stanford-8 Achievement Test battery were compared using Multivariate Analysis of Variance (MANOVA). Table I displays the means, standard deviations, and effect sizes for all three groups. HIPPY students performed better than students in the other two groups in Reading and Language Arts. HIPPY students performed better than students with Other Preschool experience in Math as well but there was not a statistically significant difference in Math performance between HIPPY students and students with No Preschool experience were only modest (d = .11 to .18). By contrast, the differences between HIPPY students and students who attended Other Preschools was stronger (d = .45 to .50). In all cases, the differences persisted through both the 3rd and 6th grades.

Teacher Ratings of Classroom Behavior. Teachers rated each child using the 11 items from the Child Classroom Adaptation Inventory. Correlations among these 11 items were quite high. Thus, a decision was made to do the primary analyses only on two rather global ratings: Item #10- overall adjustment, and Item #ll- overall academic performance. The performance of HIPPY, Other Preschool, and No Preschool groups was compared using Multivariate Analysis of Variance (MANOVA). Table 1 displays the means, standard deviations, and effect sizes on these two composite items. Teachers rated the academic performance of HIPPY children superior to that of the No Preschool group (d = .31). The trend was in the same direction for the Other Preschool group but the difference was not quite statistically significant (p < .06). Teachers also rated HIPPY students as better adjusted than children in either other group. The differences in teacher ratings for the three groups, although statistically reliable, were not large. However, they persisted for both grade levels.

Although moderate correlations between the teacher ratings of the nine specific classroom behaviors meant it was inappropriate to conduct separate tests on each behavior, we also conducted these tests since part of the reason for including several behaviors was to determine if any differences between HIPPY and non-HIPPY children in regard to classroom behavior was a function of a single overall halo effect or whether teachers observed differences only on those behaviors where the HIPPY program was hypothesized to produce strengths in children (and as a kind of hedge against selection bias). As expected there were significant differences favoring HIPPY children on enjoyment of books, listening and paying attention, task orientation, self-direction in learning, initiative, and interest in school work. There were no differences in curiosity and using assistance and only inconsistent differences in ability to get along with peers.

	HIP	PYካ	OTHE	R PRESCH	OOL∘	N	D PRESCHO	DOL
Outcome Measure	Mean	S. D.	Mean	S.D.	d ²	Mean	S.D.	d3
Class Grades								
(based on a 4-point grading system)								
Reading h > o, n	3.06	1.06	2.75	1.15	.28	2.81	1.11	.23
Math h>n	2.93	1.11	2.84	1.13	.08	2.66	1.22	.23
Language Arts h>o,n	3.08	0.98	2.82	1.16	.24	2.80	1.13	.26
Achievement Tests (Normal Curve Equivalents)								
Reading h > n > o	45.7	20.3	35.5	23.8	.50	43.0	19.7	.13
Math h, n > o	45.8	20.4	36.4	23.7	.45	43.5	20.0	11
Language Arts h>n>o	47.4	21.0	35.6	24.3	.50	43.7	19.4	.18
Classroom Behavior (based on 5-point rating system)								
Academic h > n	3.45	1.04	3.22	1.05	.22	3.13	1.01	. <u>3</u> 1
Adjustment h> n, o	3.57	0.87	3.34	1.05	.25	3.29	0.88	.32

Comparison of HIPPY, Other Preschool, and No Preschool Children on Grades, Achievement Test Scores, and Classroom Behavior¹

Table 1.

¹ Results were collapsed across 3rd and 6th grades because there was no grade-level by treatment group interaction.

² Effect size comparing HIPPY and Other Preschool groups

³ Effect size comparing HIPPY and No Preschool groups

Conclusions

Findings from previous studies of HIPPY have been inconsistent in confirming positive program impact on children's subsequent academic performance (Baker et al., 1999). Although both formal and informal evaluations have suggested that low income children who participate in HIPPY do better than low income children with no preschool experience, little is known about the magnitude or the sustainability of such impacts. Even less is known about the relative impact of HIPPY versus other preschool experiences, since only two studies have made such comparisons and neither had high ecologic validity. Results of this study, although limited as a function of the post hoc matching design used, indicate that participation in HIPPY had the following positive effects: 1) reduced levels of suspension, 2) higher grades, 3) higher achievement test scores, and 4) better classroom behavior. As a general rule, these effects were quite modest (effect sizes mostly about .2 to .3), but they persisted at both 3rd and 6th grades. By contrast, participation in HIPPY had no observable impact on receipt of special education services and it had little impact on classroom behaviors such as curiosity and use of assistance. These findings echo and expand findings from Bradley and Whiteside-Mansell (1995) and Bahe and Passe (1998). They also replicate the early (Cohort 1) findings by Baker, Piotrkowski, and Brooks-Gunn (1999).

In light of previous research on home visitation interventions in general and HIPPY in particular, the positive effects shown in this study should be interpreted with caution (Gomby, Cubross, & Behrman, 1999; Ramey & Ramey, 1998; Weiss, 1993). The design used is this study was not a "true" experimental design with randomized assignment of children to HIPPY, Other Preschool, and No Preschool groups. Thus, the internal validity of the study is potentially compromised. Despite efforts to control for differences attributable to demographic factors such as race and income, the methods of identifying and recruiting potentially eligible students for HIPPY may have resulted in a selection bias that could account for observed differences. Although there is no evidence to support any particular selection bias, the children who had No Preschool experience may have had parents who were less motivated or less competent. Likewise, the children with No Preschool experience may also have come from neighborhoods or contexts that are generally less supportive of school performance. These possible selection factors (and a host of others not described) are unknown and probably unknowable. Nonetheless, selection bias remains a potential alternative explanation for the differences observed. On the other hand, there are three reasons to believe that the observed differences between HIPPY and non-HIPPY in this study are not solely due to selection factors. First, in some of the communities served by the 81 participating school districts there were very limited opportunities for publicly-funded preschool experiences. That is, low-income parents who might have been motivated to seek preschool experiences for their children had effectively "no choice" available; and they would have been included in the No Preschool group. Second, HIPPY children frequently performed better than children who had other forms of preschool experience. This suggests that the observed program "effects" are not fully attributable to selection factors such as parental motivation for children's school success in that one can assume similarities in motivations among parents who participate in HIPPY and parents who seek participation in other preschool opportunities - not identical motivations but similarities in ways connected to the kinds of achievement outcomes measured. Third, the most consistent differences observed were on those behaviors and competencies most directly targeted by the HIPPY program. There were no program impacts on child outcomes not

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targeted by the program (e.g., curiosity, use of assistance from the teacher, ability to get along with peers) or on outcomes where no effect was anticipated (e.g., special education placement). Although this does not fully eliminate selection bias as a contributor to observed differences, it at least calls into question that selection bias is solely responsible for the observed differences; that is, it would seem remarkably coincidental that selection bias would have produced the same impacts (and only those impacts) hypothesized for the program.

Unfortunately, pretest academic data were not available on children in the Other Preschool or No Preschool groups. Thus, it was not possible to increase the sensitivity of the analyses to take account of initial differences in competence. On the other hand, given that developmental delay at age 3 (or 4) was a consideration in providing HIPPY services to some families, it is unlikely that the HIPPY group contained a disproportionate number of high functioning children at the time of entry (i.e., children who would have also been likely to do better in school even without help).

One of the more puzzling findings from this study was the consistent difference between HIPPY children and children with Other Preschool experience. Such differences were not expected either based on theory or based on the two studies that previously made such comparisons. However, the findings in favor of HIPPY were not all that surprising either. Not all preschool programs, however well intended, are well funded or of high quality. Bamett's (1995) review of preschool programs makes clear that adequacy of funding and assurance of quality are important if programs are to produce long-term successes of the kinds measured in this study. Additionally, there is evidence that some of the center-based programs with positive effects on children's academic behavior also have program components targeted to parents; and that part of the impact of such programs on child academic success is mediated through impacts on the child's home environment (Bradley, Whiteside, Mundfrom, Casey, Caldwell, & Barrett, 1994).

The study is limited in that no effort was made to determine whether the HIPPY program differentially benefited one sub-group more than another (e.g., males more than females, African-Americans more than European-Americans, etc.). Although we had no a *priori* hypotheses suggesting that gender or race or anything else would make a difference in program impact, future studies of the HIPPY program should perhaps consider testing for such moderating effects.

It is not appropriate, from a statistical point of view, to assume that each of the statistical tests done on these data represent independent tests of program effects. Running a large number of tests increases the odds of capitalizing on some chance difference between groups. Multivariate analysis of variance was used to partially offset this technical problem, nonetheless, corrections in the *p*-values used to establish differences between groups were not made given the limited power we had to detect differences of even a moderate size (e.g., 1/2 standard deviation) for the interaction effects (e.g., Program Type * Grade Level). Thus, it is possible that some of the differences represent chance findings. Nonetheless, the consistency of findings for HIPPY students makes it appear unlikely that chance was a major factor in the results (e.g., differences between HIPPY and the other groups were observed on grades, achievement test scores, and teacher ratings of academic performance).

In sum, children who completed at least one year (most completed two years) of the HIPPY program appear to have benefited long-term from the experience - granted the limitations of the study design. Although the effects were generally quite modest, they were broad-based and consistent with program aims and activities. The fact that HIPPY students were suspended less suggests that the costs of the program may at least be partially offset by later cost reductions.

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