

**Brief Analysis of Developmental Gains in HIPPY vs. Non-HIPPY Children**

Background: Jacksonville Public Schools provides a Preschool Early Intervention Program for three-, four-, and five-year-old children identified as at-risk for school failure based on family income. In addition to the Early Intervention Program, several families have elected to participate in the HIPPY program (Home Instruction Program for Preschool Youngsters), a home-based early childhood education and parent involvement program designed to help parents provide educational enrichment for their three, four, and five-year-old children.

Sample: All of the four-year-old students from three classrooms in the Early Intervention Program were administered the Battelle Developmental Screening Test in November 1999 and in July 2000. Of those 49 children, 26 participated in HIPPY and 23 were Non-HIPPY. Although the groups are not matched samples, they may be viewed as comparable, as children in both groups qualified for the early intervention due to low family income and attended the same school-based early intervention classrooms during the day.

Table 1. Gender by Group

	<u>HIPPY</u>	<u>Non-HIPPY</u>	<u>Total</u>
Boys	12	13	25
Girls	14	10	24
Total	26	23	49

Scoring: Scale scores on each subscale and on the total Battelle Developmental Screening Test were calculated for each child. First, scale scores for the total screening test were transformed into age-equivalent scores to aid parents in understanding developmental gains in months. Second, scale scores were also translated into developmental quotients to more accurately gauge developmental gains that are measured on a non-interval scale. Third, for each subscale, a pass/fail determination was made based on each child’s actual age in months. It should be noted that a conservative approach was utilized for the pass/fail determination; thus, children who scored in the “borderline range” were considered to have failed that subscale.

Findings:

Age-Equivalent Scores: Scale scores on the total Battelle Developmental Screening Test were translated into age-equivalent scores for parents to understand their child’s current level of developmental functioning. On average, over eight months, HIPPY children made larger developmental gains than non-HIPPY children in terms of gains in months on age-equivalent scores. Although HIPPY children had slightly lower full-scale developmental pretest scores than the non-HIPPY children, they gained approximately 14.8 months, while non-HIPPY children gained only 6.9 months.

Table 2. Mean Pretest and Posttest Age-Equivalent Scores by Group

	<u>N</u>	<u>Mean Pretest</u> <u>Age-Equivalent Score in</u> <u>Months</u>	<u>Mean Posttest</u> <u>Age-Equivalent Score in</u> <u>Months</u>	<u>“Approximate”</u> <u>Developmental Gain</u> <u>in Months</u>
HIPPY	26	44.7	59.5	+14.8
Non-HIPPY	23	46.3	53.2	+6.9

Developmental Quotients: It should be noted that children do not achieve developmental gains at a consistent rate. Similarly, scale scores on the Battelle are not on an interval scale. That means that incremental gains in Battelle scale scores are not equivalent to the same size incremental gains in terms of

age-equivalent scores or actual development. To address this issue, changes in developmental quotients may be calculated as follows:

$$\frac{\text{Posttest Age-Equivalent Score}}{\text{Actual Age at Posttest}} - \frac{\text{Pretest Age-Equivalent Score}}{\text{Actual Age at Pretest}} = \text{Change in Developmental Quotient}$$

One way to understand developmental quotients is to think of them as percentages. For example,

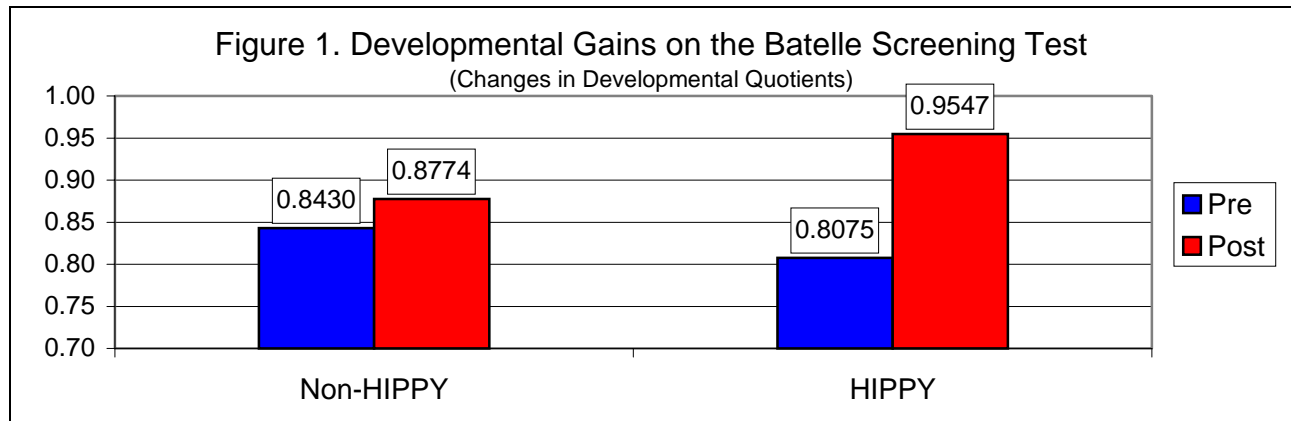
Table 3. Understanding Developmental Quotients

<u>Developmental Quotient</u>	<u>Like a Percentage</u>	<u>Explanation:</u> <u>Child's developmental age on Battelle is...</u>
0.75	75%	Lower than actual age.
1.00	100%	The same as actual age.
1.25	125%	Higher than actual age

In these two groups of preschool children, the initial developmental quotients of HIPPY participants (.8075) were lower than non-HIPPY participants (.8430). However, as all the children increased in their actual chronological age over eight months, the HIPPY children made proportionately larger gains in their developmental age or age-equivalent score (.9547) than non-HIPPY children (.8774). That is, although both groups of children registered developmental gains, HIPPY children made greater gains.

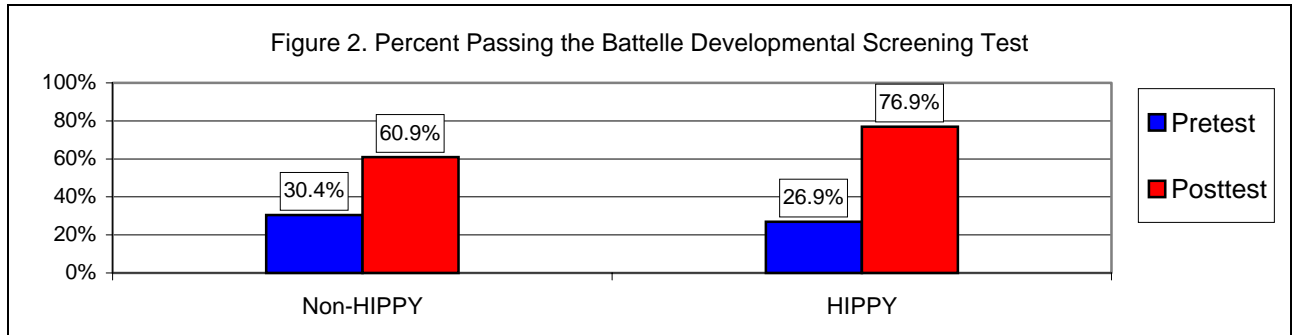
Table 4. Mean Pretest and Posttest Developmental Quotients by Group

	<u>N</u>	<u>Pretest Battelle Developmental Quotient</u>	<u>Posttest Battelle Developmental Quotient</u>	<u>Change in Developmental Quotients</u>
HIPPY	26	.8075	.9547	+ 0.1472
Non-HIPPY	23	.8430	.8774	+ 0.0344

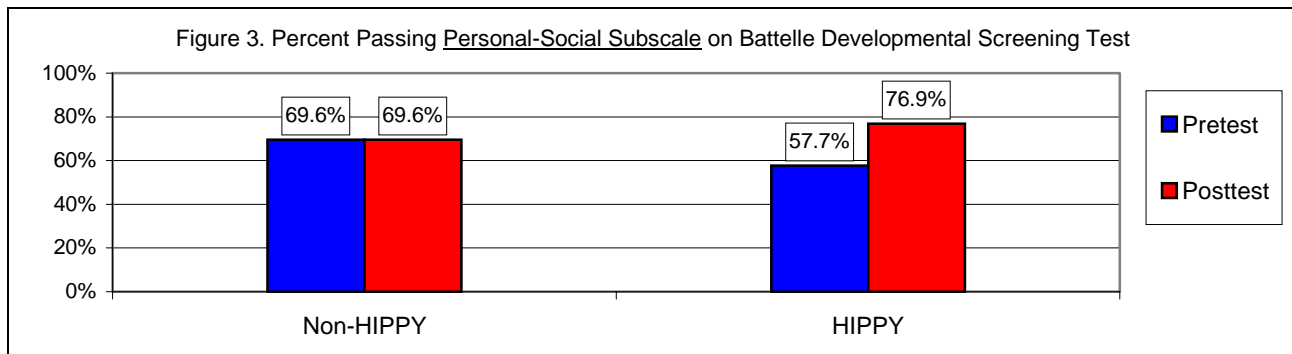


Pass/Fail Determinations on Screening Test and Subscales: The Battelle Screening Test is comprised of nine subscales or domains: personal-social, adaptive, gross motor, fine motor, motor, receptive, expressive, communication, and cognitive. There is also a total score. The Battelle Developmental Screening Test is used to identify areas in which preschool-age children are experiencing delays or deficits in development. Students attending preschool early intervention programs in Jacksonville Public Schools may be termed “at-risk” for school failure. Identifying these children at an early age and providing specific developmentally-appropriate enrichment activities may provide a firm educational foundation, foster development and prevent future learning problems. To investigate the efficacy of HIPPY for young children, the percent of children passing the entire Battelle Screening Test and each subscale on the pretest and posttest was compared for HIPPY and non-HIPPY groups. The results are presented below beginning with the total score and then in the order of each domain on the screening test.

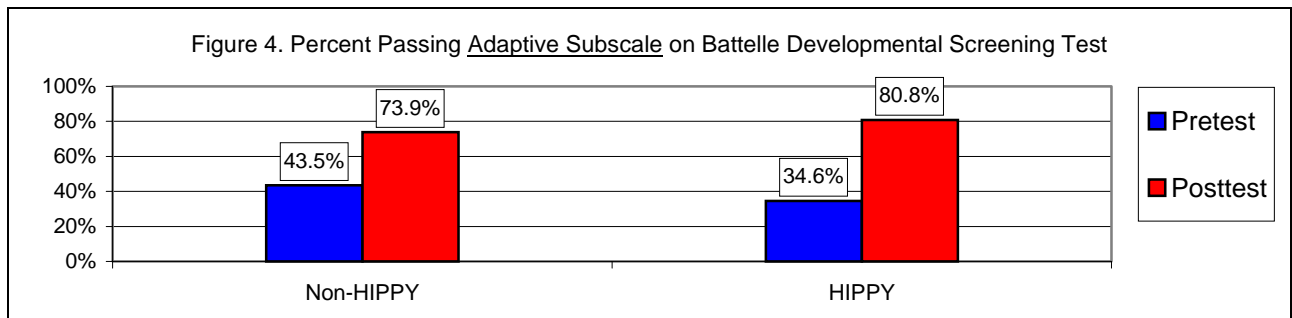
**Total Score:** Proportionately fewer HIPPY children (26.9%, 7/26) than non-HIPPY children (30.4%, 7/23) passed the Battelle Developmental Screening pretest. However, eight months later, a higher percentage of HIPPY children (76.9%, 20/26) than non-HIPPY children (60.9%, 14/23) passed the posttest. Prior to HIPPY participation, more HIPPY children would be flagged as having potential developmental delays and referred for full psychoeducational evaluations than non-HIPPY children; however, during the HIPPY year, HIPPY children are making developmental gains and mastering age-appropriate developmental competencies to a greater extent than non-HIPPY children. Key components of HIPPY including the HIPPY curriculum and service delivery system are designed to support the development of these skills.



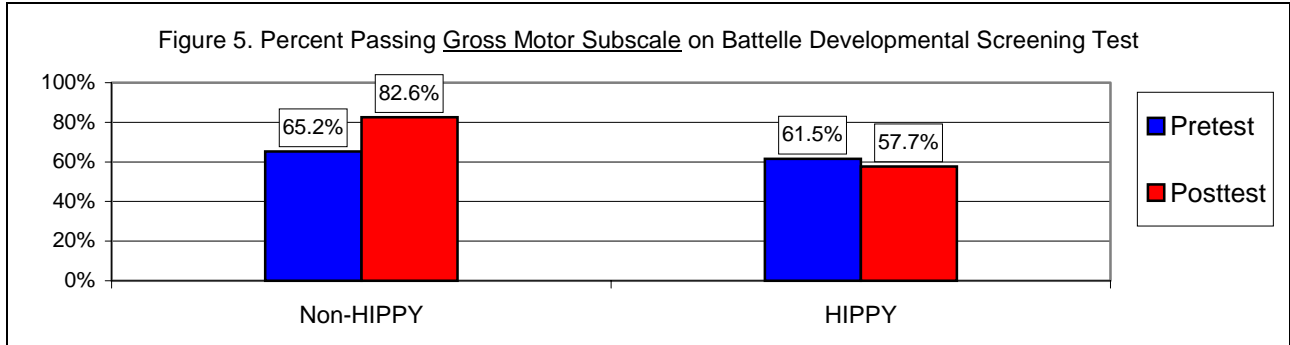
**Personal-Social:** Over eight months, there was no change in the proportion (69.6%, 16/23) of non-HIPPY children who passed the personal-social subscale of the Battelle. Although fewer HIPPY children (57.7%, 15/26) passed the personal-social pretest subscale, more HIPPY children passed the posttest (76.9%, 20/26).



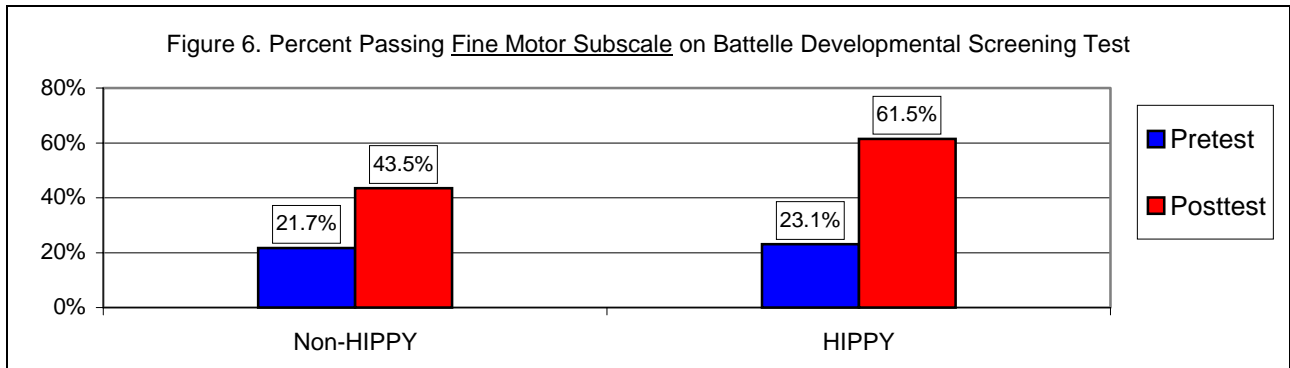
**Adaptive:** Proportionately fewer HIPPY children (34.6%, 9/26) than non-HIPPY children (43.5%, 10/23) passed the Battelle Developmental Screening pretest. However, eight months later, a higher percentage of HIPPY children (80.8%, 21/26) than non-HIPPY children (73.9%, 17/23) passed the posttest.



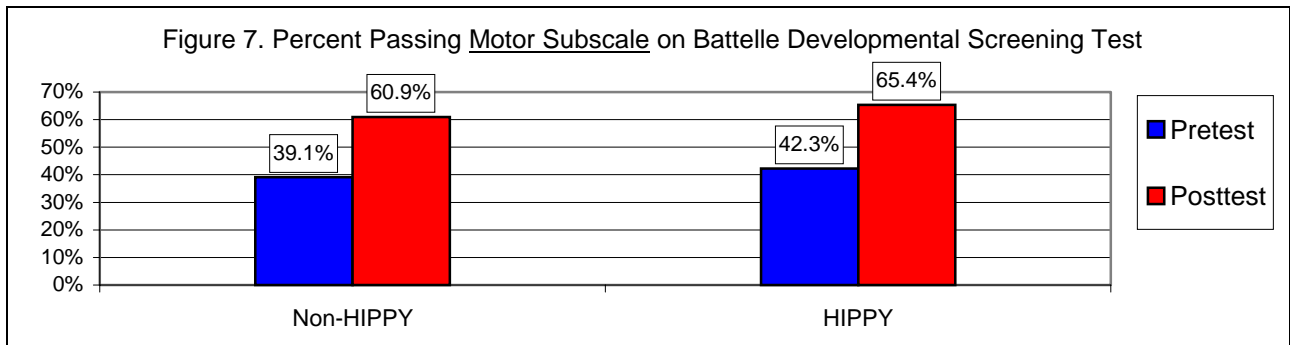
**Gross Motor:** At pretest, slightly more non-HIPPY (65.2%, 15/23) than HIPPY (61.5%, 16/26) children passed the gross motor subscale of the Battelle Developmental Screening Test. At posttest, proportionately more non-HIPPY children (82.6%, 19/23) passed the gross motor subscale, while even fewer HIPPY children (57.7%, 15/26) passed.



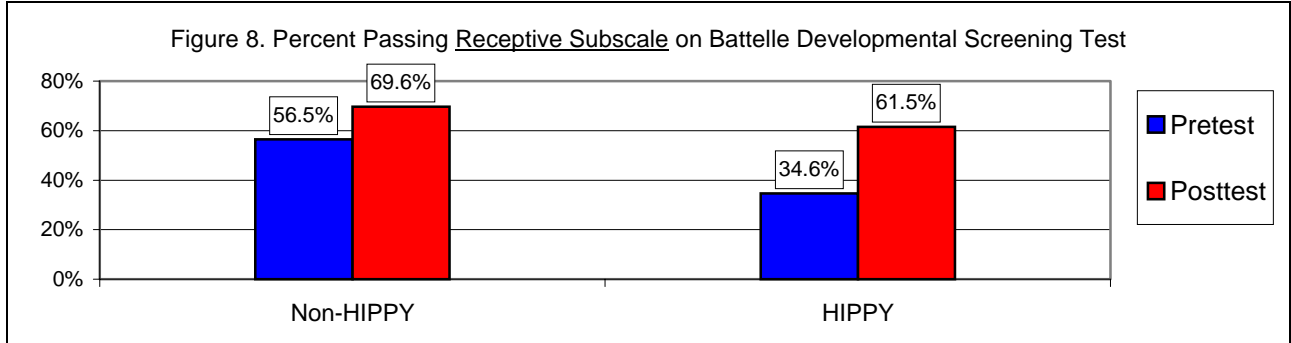
**Fine Motor:** At pretest slightly more HIPPY children (23.1%, 6/26) than non-HIPPY children (21.7%, 5/23) passed the fine motor subscale. However, eight months later, a much higher percentage of HIPPY children (61.5%, 16/26) than non-HIPPY children (43.5%, 10/23) passed the posttest. These striking results are not surprising, given the emphasis on the development of fine motor skills such as using pencils, drawing shapes, lines, pictures, sorting, and cutting with scissors that are emphasized in HIPPY activity packets.



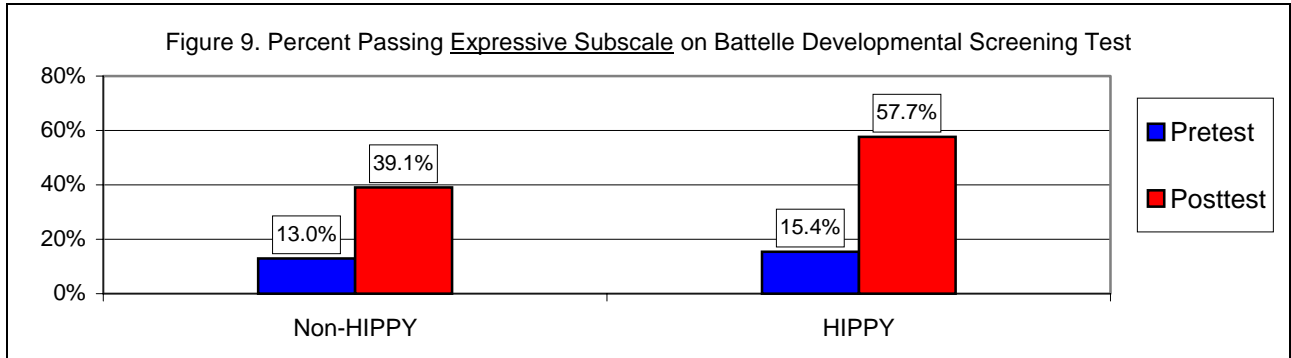
**Motor Subscale:** Although both groups made gains on the motor subscale of the Battelle Developmental Screening Test, proportionately more HIPPY children passed the subscale at pretest (42.3%, 11/26) and posttest (65.4%, 17/26) than non-HIPPY children at pretest (39.1%, 9/23) and posttest (60.9%, 14/23).



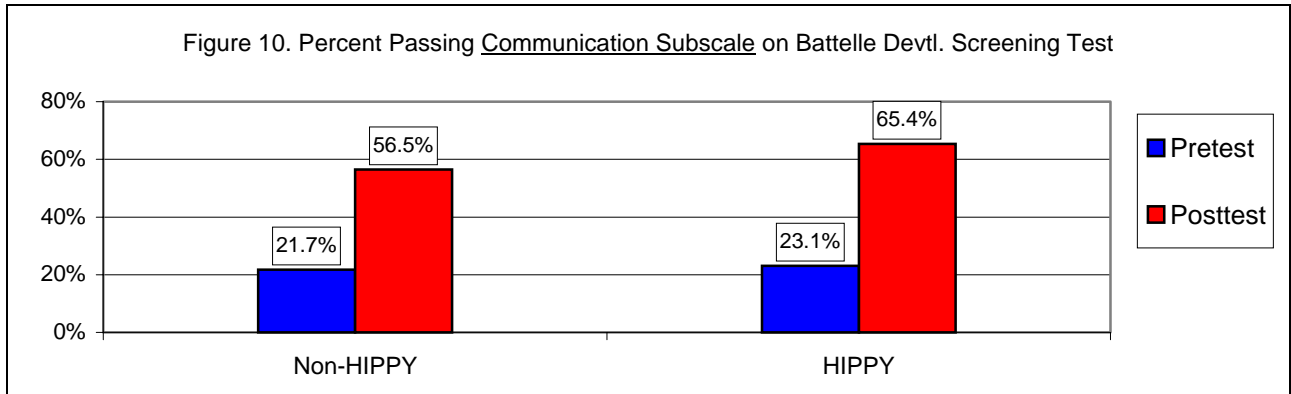
**Receptive:** The proportion of HIPPY children (34.6%, 9/26) passing the Receptive subscale of the Battelle Developmental Screening pretest was much lower than the non-HIPPY group (56.5%, 13/23). Although proportionately fewer HIPPY children (61.5%, 16/26) than non-HIPPY children (69.6%, 16/23) passed the posttest on this subscale, it should be noted that as a group, the HIPPY children made impressive gains in “catching up”.



**Expressive:** At pretest, a comparable proportion of HIPPY (15.4%, 4/26) and non-HIPPY (13.0%, 3/23) children passed the Expressive Subscale of the Battelle Developmental Screening Test. However, eight months later, a much higher percentage of HIPPY children (57.7%, 15/26) than non-HIPPY children (39.1%, 9/23) passed the posttest.



**Communication:** At pretest, a comparable proportion of HIPPY (23.1%, 6/26) and non-HIPPY (21.7%, 5/23) children passed the Expressive Subscale of the Battelle Developmental Screening Test. The proportion of children passing this subscale increased in both groups; however, at posttest, more HIPPY children (65.4%, 17/26) passed than non-HIPPY children (56.5%, 13/23).



**Cognitive:** At pretest, the proportion of children in both groups who passed the Cognitive Subscale of the Battelle Developmental Screening Test was fairly low, with a few more HIPPY children (26.9%, 7/26) passing than non-HIPPY children (17.4%, 4/23). After eight months of HIPPY, the proportion of HIPPY children who passed the Cognitive Subscale increased to 69.2% (18/26) while the proportion of non-HIPPY children who passed fell to 8.7% (2/23). These results lend support to the efficacy of the HIPPY curriculum and suggest that developmentally appropriate activities provided through HIPPY (in addition to interventions provided to both groups through a school-based program) are effective in targeting and supporting cognitive development in preschoolers.

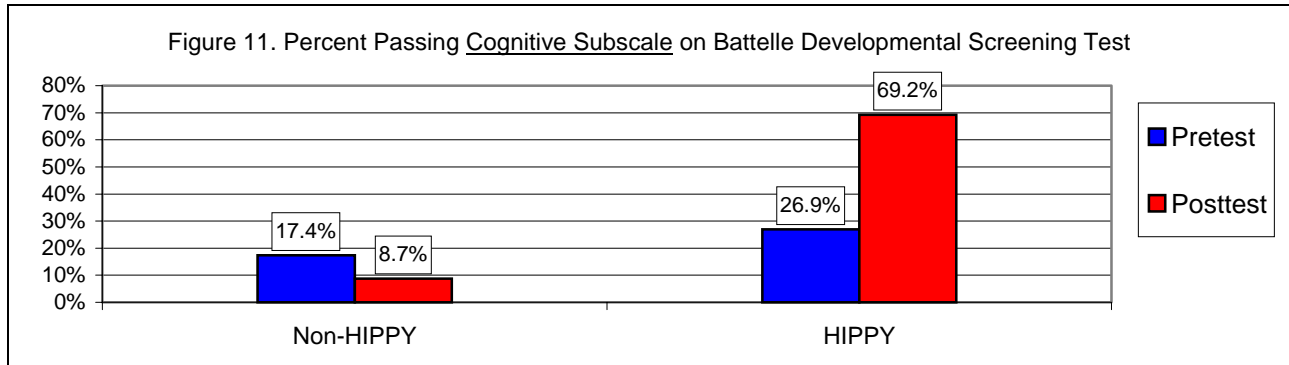


Table 5 shows the difference in the percentage of children in each group who passed each subscale or domain of the Battelle Developmental Screening posttest. On the entire test and seven of nine subscales/domains, proportionately more HIPPY children passed the test.

Table 5. Percentage Passing Each Subscale/Domain at Posttest by Group

	<u>Non-HIPPY</u>	<u>HIPPY</u>	<u>Difference</u>
Personal-Social	69.6%	76.9%	+7.3%
Adaptive	73.9%	80.8%	+6.9%
Gross Motor	82.6%	57.7%	-24.9%
Fine Motor	43.5%	61.5%	+18.0%
Motor	60.9%	65.4%	+4.5%
Receptive	69.6%	61.5%	-8.1%
Expressive	39.1%	57.7%	+18.6%
Communication	56.5%	65.4%	+8.9%
Cognitive	8.7%	69.2%	+60.5%
Total	60.9%	76.9%	+16.0%

**Summary and Conclusions:** Over eight months (or approximately 30 weeks of the home-based HIPPY curriculum) HIPPY children demonstrated substantial developmental gains, compared to similar children who received the same early intervention program during the day, but whose families did not participate in the HIPPY program after school.

- Comparing age-equivalent pretest and posttest scores on the Battelle Developmental Screening Test, HIPPY children gained approximately 14.8 months versus 6.9 months for the non-HIPPY group over eight months.
- Comparing changes in developmental quotients computed over eight months on the Battelle Developmental Screening Test, HIPPY children registered an increase of 0.1472 versus 0.0344 for the non-HIPPY group.
- The Battelle Developmental Screening Test is an instrument that is used to flag children who may have potential developmental delays and refer them for complete psychoeducational evaluations.

Prior to HIPPY participation, more HIPPY than non-HIPPY children failed the screening test; however, after eight months of HIPPY, more HIPPY children than non-HIPPY children passed the screen.

At posttest, proportionately more HIPPY children passed 7/9 subscales or domains than non-HIPPY children:

- Personal-Social (76.9% vs. 69.5%)
- Adaptive (80.8% vs. 73.9%)
- Fine Motor (61.5% vs. 43.5%)
- Motor (65.4% vs. 60.9%)
- Expressive (57.7% vs. 39.1%)
- Communication (65.4% vs. 56.5%)
- Cognitive (69.2% vs. 8.7%)

The largest posttest differences between the two groups were on the cognitive, fine motor, and expressive communication subscales—the domains most intensely addressed by the HIPPY program. In this investigation, it appears that the HIPPY program is efficacious for increasing developmental gains among at-risk preschoolers, above and beyond educational supports received through a school-based early intervention program.