

**THE HILL CENTER REGIONAL EDUCATION MODEL:  
EVALUATION RESULTS OF THE HILL READING ACHIEVEMENT  
PROGRAM IN BRUNSWICK COUNTY SCHOOLS**

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## **EXECUTIVE SUMMARY**

### **Background**

The purpose of this evaluation study was to determine the effectiveness of the Hill Reading Achievement Program (HillRAP) in improving the reading achievement of students who need remediation in reading in Brunswick County Schools. Evaluation questions were:

1. Do students who receive HillRAP instruction improve academic achievement in reading, overall, and by student groups?
2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?
3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?

The study sample included 325 elementary and middle school students who were pretested and posttested during the 2009-2010 school year (first year sample) and 164 elementary, middle, and high school students who continued in HillRAP for a second year (two year longitudinal sample). Data collection included:

- Woodcock-Johnson III Tests of Achievement: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack tests. These tests were administered prior to HillRAP implementation (pretest) and following one and two years of implementation.
- North Carolina End-of-Grade Reading Comprehension Test: This state assessment is administered at each school to students in grades 3 through 8. Levels I and II indicate below grade level achievement; Levels III and IV indicate at or above grade level achievement. Student scores for the year prior to HillRAP implementation were obtained (pretest) as well as scores for each subsequent year of implementation.
- HillRAP Attendance Record: HillRAP teachers entered these data into the Hill Center Database to document and monitor student attendance in HillRAP sessions.
- HillRAP Teacher Observation Form: In year one, Hill Center Master Teachers/Trainers completed this form as part of their regular observations of HillRAP teachers. In year two, Brunswick County Schools HillRAP mentors also completed observations/forms.

Other data used in the study included student demographic data. All participating students had parental permission (informed consent) to participate in the study. Data analysis included descriptive statistics, t-tests, repeated measures analysis of variance, and correlation.

### **Summary of Findings and Related Recommendations**

Findings provide support for HillRAP as an effective program for improving the reading achievement of struggling readers. Across years and student groups, HillRAP students demonstrated greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. They similarly demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test, moving from lower to higher achievement levels. The following are specific findings and related recommendations for future studies of HillRAP.

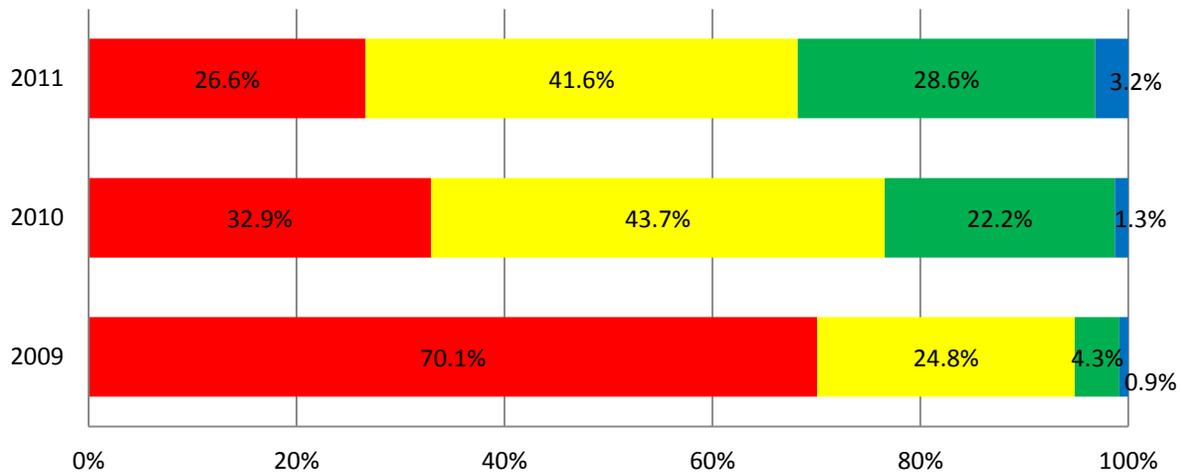
#### **Overall, elementary and secondary school students who received HillRAP instruction improved academic achievement in reading.**

- HillRAP students demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, students decreased and sometimes closed the gap between their achievement and the average achievement range of the tests.
- HillRAP students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level increased from 4.5% prior to HillRAP to 24.6% after one year of implementation. The percentage of students who scored at Level I decreased from 62.7% to 31.1% after one year of HillRAP. Further, for students who received HillRAP for two years, the percentage who scored at or above grade level increased from 5.2% to 31.8% and the percentage who scored at Level I decreased from 70.1% to 26.6%.

**Overall, a pattern of students demonstrating greater growth after two years of HillRAP instruction was evidenced.**

- Students who received HillRAP instruction for two years (two year longitudinal sample) demonstrated greater growth than those who received it for one year on all Woodcock-Johnson III reading tests administered.
- Students who received HillRAP instruction for two years (two year longitudinal sample) demonstrated greater movement from lower to higher achievement levels on the North Carolina End-of-Grade Reading Comprehension Test than students who received one year of HillRAP instruction. The figure below shows this movement.
- To better determine the impact of longer participation in HillRAP, future studies should include a larger sample from the beginning and efforts should be made to ensure that as many students as possible remain in HillRAP after one year. In addition, future studies should include an implementation period of more than two years to determine the impact of longer participation in the program.

***Overall North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Two Year Longitudinal Sample***



<sup>a</sup>2009 sample n =117 and includes only grades 4-8. 2010 sample n = 158, 2011 sample n = 154 and include grades 3-8

**Elementary school students who received HillRAP instruction improved academic achievement in reading.**

- Elementary school students demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, students decreased and sometimes closed the gap between their achievement and the average achievement range of the tests.
- Elementary school students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level increased from 5% prior to HillRAP to 24.4% after one year of implementation. The percentage of students who scored at Level I decreased from 61.9% to 28.2%.

**Secondary school students demonstrated notable growth in reading achievement.**

- Although they generally started out with lower means at pretest, secondary school students (middle and high school students) made statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. They decreased and sometimes closed the gap between their achievement and the average achievement range of the tests. Further, secondary students in the first year sample demonstrated greater growth compared to the overall sample on Woodcock-Johnson III reading tests administered; secondary students in the two year longitudinal sample demonstrated greater growth compared to the overall sample on three of the four tests.
- Middle school students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level increased from 3.2% prior to HillRAP to 17.5% after one year of implementation. The percentage of students who scored at Level I decreased from 65.1% to 38.1%.
- Subsequent studies of HillRAP should include a larger number of secondary school students, from middle and high school, to better determine the impact of the program on these students.

**Students Identified to Receive Exceptional Children’s Services who received HillRAP instruction improved academic achievement in reading.**

- Students identified to receive Exceptional Children’s services demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, students decreased the gap between their achievement and the average achievement range of the tests.
- Students identified to receive Exceptional Children’s services demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level increased from 9.08% prior to HillRAP to 18.18% after one year of implementation. The percentage of students who scored at Level I decreased from 62.3% to 39%. Further, for students who received HillRAP for two years, the percentage who scored at or above grade level increased from 11.36% to 40.91% and the percentage who scored at Level I decreased from 70.5% to 22.7%. Thus, students who received two years of HillRAP demonstrated greater movement from lower to higher achievement levels than those who received one year.
- Future studies of HillRAP should include more students representing the different types of Exceptional Children’s services for which students are identified to better understand the effectiveness of the program in meeting the needs of these groups of students.

**White students who received HillRAP instruction improved academic achievement in reading.**

- White students demonstrated statistically significant and greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, students decreased and sometimes the gap between their achievement and the average achievement range of the tests.
- White students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level increased from 7.44% prior to HillRAP to 23.14% after one year of implementation. The percentage of students who scored at Level I decreased from 64.5% to 28.1%. Further, for students who received HillRAP for two years, the percentage who scored at or above grade level increased from 8.62% to 31.04% and the percentage who scored at Level I decreased

from 70.7% to 27.6%. Thus, White students who received two years of HillRAP demonstrated greater movement from lower to higher achievement levels than those who received one year.

**Black students who received HillRAP instruction improved academic achievement in reading.**

- Black students demonstrated greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, students decreased and sometimes closed the gap between their achievement and the average achievement range of the tests.
- Black students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test. The percentage of students who scored at or above grade level increased from 2.5% prior to HillRAP to 21.25% after one year of implementation. The percentage of students who scored at Level I decreased from 62.5% to 33.8%. Further, for Black students who received HillRAP for two years, the percentage who scored at or above grade level increased from 3.13% to 28.13% and the percentage who scored at Level I decreased from 65.6% to 28.1%.
- A contradiction was evidenced for Black students in the evaluation study. Although they started out with higher means at pretest on the Woodcock-Johnson III reading tests compared to the overall sample, they started out at lower North Carolina End-of-Grade Reading Comprehension Test achievement levels comparatively. Subsequently, they demonstrated less growth on the Woodcock-Johnson III reading tests compared to the overall sample, but greater growth on the North Carolina End-of-Grade Reading Comprehension Test. Future studies of HillRAP should include larger numbers of Black students to better determine program impacts for this group of students.

**Hispanic students generally demonstrated greater growth in reading achievement compared to the overall sample; this growth was notably higher for Hispanic students who received two years of HillRAP.**

- Hispanic students demonstrated greater than expected growth for average ability students their age on all Woodcock-Johnson III reading tests administered. In addition, students

decreased and sometimes closed the gap between their achievement and the average achievement range of the tests.

- Hispanic students demonstrated notable growth on the North Carolina End-of-Grade Reading Comprehension Test, moving from lower to higher achievement levels. No student scored at or above grade level prior to HillRAP; 28% scored at grade level after one year of implementation and the percentage of students who scored at Level I decreased from 60% to 28%.
- Subsequent studies of HillRAP should include a larger number of Hispanic students to better determine the impact of the program on this student group.

### **Additional Recommendations Related to Study Limitations**

Based on limitations of the evaluation study, the following recommendations should also be considered:

**A major limitation of the evaluation study was the lack of a comparison group.** Similar to other studies of HillRAP (Christopoulos, Rosanbalm, & Rabiner, 2011a; Christopoulos, Rosanbalm, & Rabiner, 2011b; Downing et al., 2007), a quasi-experimental single group pretest-posttest design was used, increasing threats to the internal validity of study results—i.e., the degree to which results can be attributed to HillRAP. Although a historical cohort comparison group component was part of the design for the current study, issues with sample selection and available data precluded its inclusion in the evaluation. Thus, future studies of HillRAP should employ a comparison group design with a large sample to better determine the effectiveness of the program.

**The designs used for this and other HillRAP studies have been quantitative.** Future studies of HillRAP should incorporate qualitative methods to gain deeper understanding of the program as it is implemented in public school settings.

**UNCW used data that were collected for purposes other than the evaluation study.**

HillRAP student attendance was documented by HillRAP teachers; HillRAP teacher observations and proficiency ratings were conducted by Hill Center Master Teachers/Trainers and school district mentors for formative assessment and HillRAP certification. For future studies, evaluators should make sure data collection instruments and methods align with the needs of the study to the extent possible.

Despite limitations, **this evaluation study contributes to a growing body of support for HillRAP as an effective program for improving the reading achievement of struggling readers.** Results of this study are consistent with those of previous studies of HillRAP (Christopolous, Rosanbalm, & Rabiner, 2011a; Christopolous, Rosanbalm, & Rabiner, 2011b; Downing, Williams, & Holden, 2009; Downing, Williams, Lasater, & Bell, 2007). This replication increases the external validity of results—i.e., the extent to which study results apply to other people and settings. Replication studies of HillRAP should be continued across diverse school settings and populations.

## INTRODUCTION

The University of North Carolina Wilmington (UNCW) was contracted by The Hill Center to provide an external evaluation study of the Hill Reading Achievement Program (HillRAP) as it was implemented in Brunswick County Schools from the Fall of 2009 through the Spring of 2011. The evaluation was part of a project funded by the Robertson Foundation, the *Hill Center Regional Education Model*, a partnership among The Hill Center, Brunswick County Schools, and UNCW. The purpose of the evaluation was to determine the effectiveness of HillRAP.

Evaluation questions were:

1. Do students who receive HillRAP instruction improve academic achievement in reading, overall, and by student groups?
2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?
3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?

### Background

Through multiyear funding from the Robertson Foundation, The Hill Center partnered with Brunswick County Schools and UNCW to implement and evaluate the effectiveness of HillRAP in improving the reading achievement of struggling readers in elementary, middle, and high school. The *Hill Center Regional Education Model* involved intensive training and support of teachers; as well as support within the district, including school leaders, general and special education teachers, and parents. The project also included a university level course for educators offered at UNCW and online professional development offered to UNCW's Watson School of Education Professional Development System Partnership of 12 school districts in southeastern North Carolina. However, the focus of the evaluation was the outcomes of the implementation of HillRAP in Brunswick County Schools.

HillRAP is a theoretically supported program that builds on the principles of the research-based, multisensory Orton-Gillingham approach (see Ritchey & Goeke, 2006); is aligned with the recommendations of the National Reading Panel (National Institute of Child Health and Human

Development, 2000); and The Hill Center's teacher certification program is accredited by the International Multisensory Structured Language Education Council. Implementation of HillRAP includes intensive teacher professional development and ongoing mentoring, 45 to 50 minute instructional sessions 4 to 5 days a week (see Ritchey & Goeke, 2006), and a 4 to 1 student to teacher ratio. HillRAP was first implemented in public schools from 2003 to 2006 in Durham Public Schools. Given positive results (Downing, Williams, Lasater, & Bell, 2007), HillRAP was continued in Durham Public Schools (2008-2010) and subsequently implemented in Davie County Schools (2008-2010), Carteret County Schools (2008-2011) and Brunswick County Schools (2009-2011), the latter being the site for this evaluation study.

## **PROCEDURES**

### **Study Sample**

Students were selected to participate in HillRAP based on criteria specified in the Hill Reading Achievement Program Student Selection Checklist (see Appendix A). The Checklist was developed by the *Hill Center Regional Education Model* partners and includes items related to student achievement and identifying students who would likely benefit from the program. The Brunswick County Schools HillRAP Coordinator met individually with each school principal to explain HillRAP in more detail and to describe the types of students that would be best served by the program. Checklists were completed and students were identified at each school, often by teams (school administrators, teachers). Parental consent was obtained for all 383 students who were pretested in Fall 2009.

Of the 383 students who were pretested in Fall 2009, 325 remained in the program for the entire 2009-2010 school year and were posttested in Spring 2010. These 325 students were the first year sample for the study. They received HillRAP instruction from 32 teachers in 14 schools: 9 elementary schools, 4 middle schools, and 1 K-8 school. For the 2010-2011 school year, 164 students from the first year sample continued in HillRAP. The students in this two year longitudinal sample received HillRAP instruction from 36 teachers in 17 schools: 9 elementary schools, 3 middle schools, 1 K-8 school, 3 high schools, and 1 6-12 grade alternative school. Twenty-two teachers taught HillRAP for both years of the study. More information about the

schools involved is provided in Appendix B. Tables 1 through 5 include the characteristics of the study samples and attrition groups for each year of the evaluation.

**Year One (2009-2010)**

**First Year Sample (n = 325).** Table 1 includes the characteristics of the 325 students in the first year sample. These students were pretested in Fall 2009 and then posttested in Spring 2010 after one year of HillRAP instruction. Most of the students were at the elementary level (79.1%). Slightly over half of the students were White (52.3%). Nearly one-third of the students were Black (30.5%). Most of the students were not identified to receive EC services (66.5%).

Table 1

*Characteristics of Students in First Year Sample (n = 325)*

Characteristic	Number of Students	Percentage of Students
School Level		
Elementary	257	79.1
Middle School	68	20.9
Gender		
Male	184	56.6
Female	141	43.4
Race/Ethnicity		
White	170	52.3
Black	99	30.5
Hispanic	32	9.8
Multiracial	19	5.8
American Indian	4	1.2
Asian	1	.3
Identified to Receive Exceptional Children’s Services		
Yes	109	33.5
No	216	66.5

**Year Two (2010-2011)**

**Two Year Longitudinal Sample (n = 164).** Table 2 includes the characteristics of the 164 students in the two year longitudinal sample. These were students from the first year sample who continued receiving HillRAP instruction for a second year. Most students were at the

elementary level (68.9%). Over half of the students were White (54.9%). Over half of the students were not identified to receive EC services (58.5%).

Table 2

*Characteristics of Students in Two Year Longitudinal Sample (n = 164)*

Characteristic	Number of Students	Percentage of Students
<b>School Level<sup>a</sup></b>		
Elementary	113	68.9
Middle School	47	28.7
High School	4	2.4
<b>Gender</b>		
Male	99	60.4
Female	65	39.6
<b>Race/Ethnicity</b>		
White	90	54.9
Black	42	25.6
Hispanic	14	8.5
Multiracial	13	7.9
American Indian	4	2.4
Asian	1	.6
<b>Identified to Receive Exceptional Children's Services</b>		
Yes	68	41.5
No	96	58.5

<sup>a</sup>Based on 2010-2011 grade level

**Two Year Longitudinal Attrition Group (n = 161).** Table 3 includes the characteristics of the 161 students in the two year longitudinal attrition group. These students were part of the first year sample, but did not continue receiving HillRAP instruction for a second year. Most of the students were at the elementary level (75.2%). Nearly half the students were White (49.7%). Over one-third of the students were Black (35.4%). Most of the students were not identified to receive EC services (74.5%). Based on a comparison of the characteristics of students in the two year longitudinal sample (see Table 2) and the two year longitudinal attrition group (see Table 3), the percentage of students not identified to receive EC services in the two year longitudinal attrition group was notably higher (74.5%) than that of students not identified to receive EC services in the two year longitudinal sample (58.5%). Thus, students not identified to receive EC services left the study at a higher rate than students identified to receive EC services.

In addition, several factors contributed to students not receiving HillRAP for a second year, i.e., study attrition (see Table 3). The most common factor was that students changed schools and enrolled in either a school that did not offer HillRAP or a school that did not have available space in HillRAP groups (54%). A second common factor was lack of funding for teaching positions (31.1%). Some teaching positions were funded with temporary money from the State during year one of the study that was not available in year two. In addition, school districts in North Carolina experienced budget cuts that resulted in the loss of teaching positions, teachers being transferred to different schools, and increased class sizes during the time of the study.

Table 3

*Characteristics of Students in Two Year Longitudinal Attrition Group (n = 161)*

Characteristic	Number of Students	Percentage of Students
<b>School Level<sup>a</sup></b>		
Elementary	121	75.2
Middle School	40	24.8
<b>Gender</b>		
Male	85	52.8
Female	76	47.2
<b>Race/Ethnicity</b>		
White	80	49.7
Black	57	35.4
Hispanic	18	11.2
Multiracial	6	3.7
American Indian	0	0
Asian	0	0
<b>Identified to Receive Exceptional Children's Services</b>		
Yes	41	25.5
No	120	74.5
<b>Reason for Leaving HillRAP</b>		
Changed Schools	87	54
Reduced Staff	50	31.1
Moved out of District	13	8.1
Scheduling Conflicts	6	0.4
Parental Consent Revoked	3	0.2
No Longer Needed HillRAP	2	0.1

<sup>a</sup>Based on 2009-2010 grade level

## Data Collection and Analysis

Data collection and analysis procedures are described in the following sections, organized by research question.

### 1. Do students who receive HillRAP instruction improve academic achievement in reading, overall, and by student groups?

Woodcock-Johnson III Tests of Achievement (WJ-III) scores and North Carolina End-of-Grade (NC EOG) Reading Comprehension Test achievement levels were used to address research question one.

**Woodcock-Johnson III Tests of Achievement.** Each student was individually pretested and posttested using four WJ-III tests: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. The WJ-III tests are nationally normed, standardized tests. The four WJ-III tests used for this evaluation measure important dimensions of phonological awareness, phonics knowledge, and reading achievement (see Table 4).

Table 4

*Description of Woodcock-Johnson III Tests Used*

Test	Area/Narrow Abilities	Skills Measured
Letter-Word Identification	Reading <i>Reading decoding</i>	Identifying letters and pronouncing lists of words correctly
Reading Fluency	Reading <i>Reading speed</i> <i>Semantic processing speed</i>	Ability to quickly read simple sentences, decide if the statement is true, and then circle Yes or No.
Passage Comprehension	Reading <i>Reading comprehension</i> <i>Cloze ability</i>	Ability to match a rebus (pictographic representation of a word) with an actual picture of the object and identifying missing key words that make sense in the context of a passage
Word Attack	Reading <i>Reading decoding</i> <i>Phonetic coding</i>	Applying phonic and structural analysis skills to the pronunciation of unfamiliar printed words

*Source: Woodcock-Johnson III Tests of Achievement Examiner's Manual (2001)*

Trained UNCW test administrators conducted pretests of students in the Fall of 2009 and posttested students in the Spring of 2010. Students in the two year longitudinal sample were tested again in the Spring of 2011. Resulting raw scores were transformed to age-referenced standard scores and grade equivalency using the *WJ-III Normative Update Compuscore and Profiles Program*. Age-referenced standard scores are based on test norms and account for expected academic growth for students at a given age over the course of a school year. In other words, a student who makes the expected growth for an average child of the same age would have the same standard score at the beginning and end of the school year. Thus, an increase in a standard score indicates greater than expected growth; a decrease indicates the opposite. In addition, the average standard score for the WJ-III is 100, with scores from 90 to 110 considered to be in the “average” range; scores from 80 to 89 are considered to be in the “low average” range (Mather & Woodcock, 2001).

After transforming scores, UNCW conducted descriptive analysis of pretest to posttest differences for the first year sample and two year longitudinal sample, by school level (elementary and secondary) and student groups, as appropriate given sample size. Paired samples t-tests were also conducted for the first year sample and repeated measures analysis of variance were conducted for the two year longitudinal sample to determine if any observed differences were statistically significant.

***North Carolina End-of-Grade Reading Comprehension Tests.*** The NC EOG Reading Comprehension Test is a curriculum-based, multiple-choice achievement test aligned to the *North Carolina Standard Course of Study*, aligned to the curricula of each grade level to assess students in relation to expected *on-grade level* performance. The test assesses reading and knowledge of vocabulary by having students read both literary and informational selections and then answer questions related to those sections. It is administered during the final weeks of the school year to students in grades 3 through 8.

Brunswick County Schools provided available NC EOG Reading Comprehension Test scale scores and achievement levels to UNCW for students in the first year sample and in the two year longitudinal sample. Because some students took the regular administration of the test and others

took an alternative test, scale scores were not used for analysis. However, both the standard and alternative tests yield categorical achievement levels for students: Levels I and II indicate below grade level achievement, and Levels III and IV indicate at or above grade level achievement (see Figure 1).

Figure 1

*NC EOG Reading Comprehension Achievement Levels Descriptors*

**Level I:** Students performing at this level do not have sufficient mastery of knowledge and skills in this subject area to be successful at the next grade level.

**Level II:** Students performing at this level demonstrate inconsistent mastery of knowledge and skills that are fundamental in this subject area and that are minimally sufficient to be successful at the next grade level.

**Level III:** Students performing at this level consistently demonstrate mastery of grade-level subject matter and skills and are well prepared for the next grade level.

**Level IV:** Students performing at this level consistently perform in a superior manner clearly beyond that required to be proficient at grade-level work.

*Source: North Carolina Department of Public Instruction*

UNCW conducted descriptive analysis of differences in student achievement level data for the first year sample (2009-2010) and the two year longitudinal sample (2009-2011), overall, and by student groups, as appropriate given sample size.

**2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?**

HillRAP Attendance Record data were used to address research question two. A HillRAP session was defined as attendance for a 45-50 minute class period of HillRAP instruction.

HillRAP teachers completed the HillRAP Attendance Record using the Hill Center Database for their HillRAP students. The Hill Center provided these data to UNCW for descriptive and correlation analysis.

### **3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?**

The “Overall Teacher Proficiency” rating from the HillRAP Teacher Observation Form was used to address research question three. Each HillRAP teacher is observed five times as part of ongoing training/mentoring, to ensure fidelity of implementation, and as part of HillRAP certification. In year one (2009-2010), Hill Center Master Teachers/Trainers completed the HillRAP Teacher Observation Form. In year two (2010-2011), observations were completed by both Hill Center Master Teachers/Trainers and Brunswick County Schools HillRAP mentors. The Hill Center provided HillRAP Teacher Observation Forms/ratings to UNCW for descriptive analysis. Ratings are on a scale of 1 to 3, with 3 indicating the high point on the scale. UNCW received data for 46 HillRAP teachers over two years of implementation; however, two teachers were missing an observation form and one teacher was removed from the certification process, so was only observed three times.

#### **Historical Cohort Comparison Group Design Component**

In addition to the single group pretest-posttest design previously described to address research question one, UNCW included a comparison group pretest-posttest design component, using a historical cohort comparison group, in the research plan for the study. A cohort is a group of people who have similar demographic or statistical characteristics (dictionary.com, n.d.). In education, the term is often used to identify successive groups that go through a grade level, an educational program, or a training program. According to Shadish, Cook, and Campbell (2002):

[C]ohorts are particularly useful as comparison groups if (1) one cohort experiences a given treatment and earlier or later cohorts do not; (2) cohorts differ in only minor ways from their contiguous cohorts; (3) organizations insist that a treatment be given to everybody, thus precluding simultaneous controls and making possible only historical controls; and (4) an organization’s archival records can be used for constructing and then comparing cohorts (pp. 148-149).

If an earlier cohort does not receive a given treatment, they can serve as a historical cohort comparison group for a current group that is receiving the treatment. Given feasibility and ethical issues associated with implementing comparison group studies in schools (see Baruch 2007;

Baughman 2008; Cook 2003) and because Brunswick County Schools implemented HillRAP in all elementary and middle schools the first year of implementation, making it difficult to use a concurrent comparison group, use of a historical cohort comparison group for HillRAP 5<sup>th</sup> and 8<sup>th</sup> grades was proposed.

Students who were in the 5<sup>th</sup> and 8<sup>th</sup> grades during the 2008-2009 school year, the year prior to HillRAP implementation, were to serve as a historical cohort comparison group for 5<sup>th</sup> and 8<sup>th</sup> grade students who received HillRAP during the 2009-2010 school year. The Hill Reading Achievement Program Student Selection Checklist, used for selecting students to participate in HillRAP in 2009-2010, was to be used to identify 5<sup>th</sup> and 8<sup>th</sup> graders in 2008-2009 who would have been selected for HillRAP had the program been implemented that year. Archival NC EOG Reading Comprehension Test scores were to be used as pretest and posttest data.

However, the historical cohort comparison group design component could not be implemented as intended due to resource constraints in the school district. The solution was to conduct a smaller scale version of the design component, using only 5<sup>th</sup> graders from four of ten elementary schools in which there were higher numbers of 5<sup>th</sup> graders receiving HillRAP. UNCW worked with HillRAP teachers at each of the four schools to identify a historical cohort comparison group. Unfortunately, the Hill Reading Achievement Program Student Selection Checklist could not be used as it was for HillRAP students. At the time of selection, 5<sup>th</sup> graders from 2008-2009 had been gone from the schools for two years and HillRAP teachers could not complete all sections of the checklist for all potential students. Further, the school district could not provide complete demographic data for selected students without parental consent. Given issues with selection and available data for the historical cohort comparison group, analysis and results for this component of the study would be unreliable, precluding their inclusion in the evaluation study.

## RESULTS

Results are presented in the following sections, organized by research question.

### **1. Do students who received HillRAP instruction improve academic achievement in reading, overall, and by student groups?**

#### **Overall Results**

Overall WJ-III age-referenced standard score and EOG Reading Comprehension Test results are presented in Table 5 and Figures 2 and 3 for the first year sample and the two year longitudinal sample.

#### ***Overall Results: Woodcock-Johnson III Tests of Achievement***

Overall, HillRAP students in the **first year sample** and **two year longitudinal sample** made greater than expected growth on each WJ-III test (see Table 5). The range of change scores for the **first year sample** was 1.67 to 3.22 and all change scores were statistically significant. Students demonstrated greatest growth on Passage Comprehension (change = 3.22) and Word Attack (change = 3.20) tests. In addition, the Spring 2010 (posttest) mean for the Word Attack test was in the average range for WJ-III scores (mean = 92.07).

The range of change scores for the **two year longitudinal sample** was 1.88 to 5.31 and all change scores were statistically significant. Similar to the first year sample, students demonstrated the greatest growth on Word Attack (change = 5.31) and Passage Comprehension (change = 3.95) tests. Additionally, the Spring 2010 and Spring 2011 means for the Word Attack test were in the average range of the WJ-III (Spring 2010 mean = 90.95; Spring 2011 mean = 92.48). Finally, change scores were greater for each WJ-III test for the two year longitudinal sample than those of the first year sample; thus, overall, students who received HillRAP for two years demonstrated greater growth.

Table 5

*Overall Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

Test	First Year Sample (n = 325) <sup>a</sup>			Two Year Longitudinal Sample (n = 164) <sup>b</sup>			
	Fall 2009 Mean	Spring 2010 Mean	2009– 2010 Change	Fall 2009 Mean	Spring 2010 Mean	Spring 2011 Mean	2009– 2011 Change
Letter-Word Identification	87.39 (12.39)	89.07 (12.34)	1.67**	85.46 (12.76)	87.24 (12.68)	87.34 (13.02)	1.88**
Reading Fluency	84.74 (11.24)	87.80 (11.78)	3.06**	83.67 (11.35)	86.46 (11.81)	86.88 (11.71)	3.21**
Passage Comprehension	81.70 (11.25)	84.92 (11.64)	3.22**	79.55 (11.72)	83.15 (11.73)	83.50 (11.71)	3.95**
Word Attack	88.89 (10.24)	92.09 (9.70)	3.20**	87.17 (10.46)	90.95 (9.11)	92.48 (10.60)	5.31**

<sup>a</sup>n size for First Year Sample is 324 for Reading Fluency and Word Attack tests

\*p < .05. \*\*p < .01

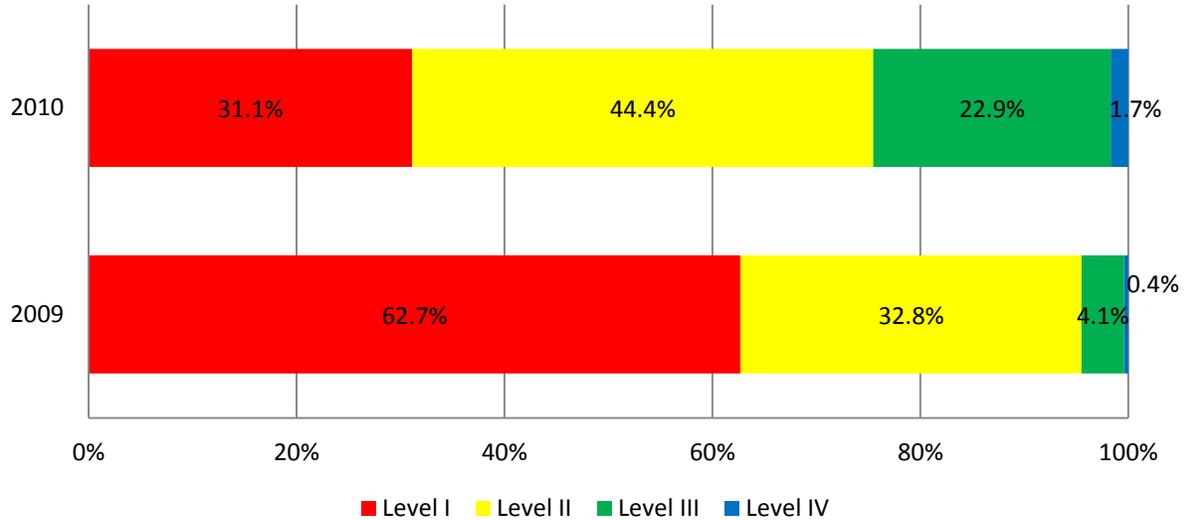
***Overall Results: North Carolina End-of-Grade Reading Comprehension Test***

Overall, students in the **first year sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension test (see Figure 2). The percentage of students who scored at or above grade level increased from 4.5% prior to HillRAP to 24.6% after one year of implementation. The percentage of students who scored at Level I decreased from 62.7% to 31.1% after one year of HillRAP.

Similarly, students in the **two year longitudinal sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 3). The percentage of students who scored at or above grade level increased from 5.2% to 31.8% after two years of HillRAP. The percentage of students who scored at Level I decreased from 70.1% to 26.6% after two years of HillRAP. Thus, students who received two years of HillRAP demonstrated greater movement from lower to higher achievement levels than students who received one year of HillRAP instruction.

Figure 2

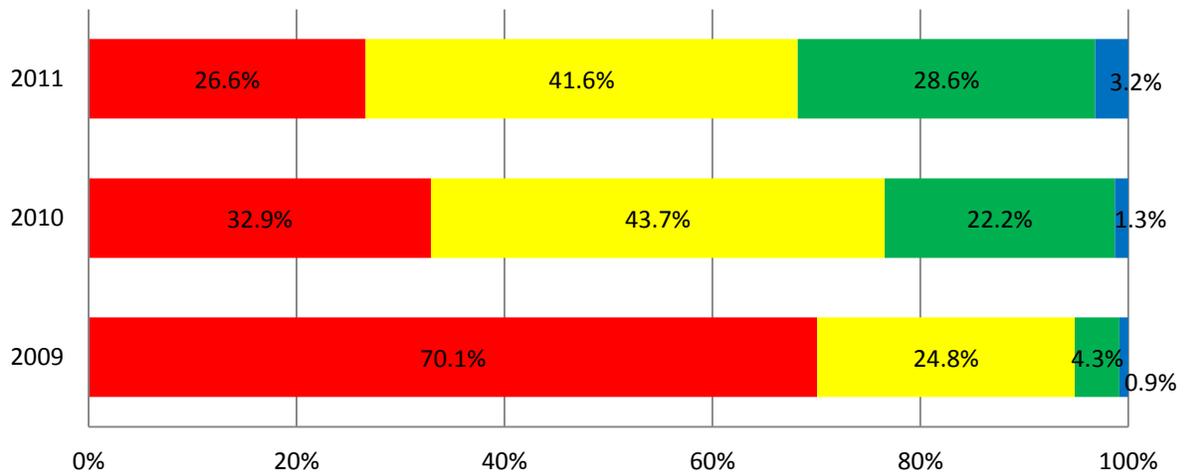
Overall North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for First Year Sample<sup>a</sup>



<sup>a</sup> 2009 sample n = 244 and includes only grades 4-8. 2010 sample n = 302 and includes grades 3-8

Figure 3

Overall North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Two Year Longitudinal Sample



<sup>a</sup> 2009 sample n = 117 and includes only grades 4-8. 2010 sample n = 158, 2011 sample n = 154 and include grades 3-8

## **School Level Results**

School Level (elementary and secondary) WJ-III age-referenced standard score and EOG Reading Comprehension Test results are presented in the following sections for the first year sample and the two year longitudinal sample. Due to some HillRAP students moving from elementary to middle school and from middle school to high school in the second year of the evaluation study, NC EOG Reading Comprehension Test results are not presented for the two year longitudinal sample by school level. Additionally, high school students were not included in the first year sample, so NC EOG Reading Comprehension Test results are for middle school students only.

### ***Elementary School Students: Woodcock-Johnson III Tests of Achievement***

Similar to overall results, elementary school students in the **first year sample** and **two year longitudinal sample** made greater than expected growth on each WJ-III test (see Table 6). The range of change scores for the **first year sample** was 1.50 to 3.14 and all change scores were statistically significant. Students demonstrated the greatest growth on Passage Comprehension (change = 3.14) and Reading Fluency (change = 3.04) tests. In addition, Fall 2009 and Spring 2010 means for the Word Attack test were in the average range for WJ-III scores (Fall 2009 mean = 90.05; Spring 2010 mean = 93.00). The Spring 2010 mean for the Letter-Word Identification test was also in the average range (mean = 90.14).

The range of change scores for the **two year longitudinal sample** was .69 to 4.28 and change scores for all tests except Letter-Word Identification were statistically significant. Similar to overall results, students demonstrated the greatest growth on Passage Comprehension (change = 4.70) and Word Attack (change = 4.28) tests and the Spring 2010 and Spring 2011 means for the Word Attack test were in the average range of the WJ-III (Fall 2009 mean = 92.20; Spring 2010 mean = 93.29). In addition, change scores were greater for Reading Fluency, Passage Comprehension, and Word Attack tests for the two year longitudinal sample than those of the first year sample; thus, elementary students who received HillRAP for two years demonstrated greater growth on these tests. Finally, elementary school students in the two year longitudinal sample demonstrated greater growth on the Passage Comprehension test compared to the overall two year longitudinal sample.

Table 6

*Elementary School Student Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

Test	First Year Sample (n = 257)			Two Year Longitudinal Sample (n = 113)			
	Fall 2009 Mean	Spring 2010 Mean	2009– 2010 Change	Fall 2009 Mean	Spring 2010 Mean	Spring 2011 Mean	2009– 2011 Change
Letter-Word Identification	88.64 (11.49)	90.14 (11.34)	1.50**	87.50 (12.26)	88.91 (11.94)	88.19 (12.17)	0.69
Reading Fluency	84.92 (10.75)	87.96 (11.09)	3.04**	84.92 (11.19)	87.73 (11.57)	88.00 (11.47)	3.08**
Passage Comprehension	82.00 (10.47)	85.14 (11.11)	3.14**	79.96 (11.70)	83.54 (11.39)	84.66 (11.25)	4.70**
Word Attack	90.05 (9.55)	93.00 (9.46)	2.95**	89.01 (10.42)	92.20 (8.75)	93.29 (10.31)	4.28**

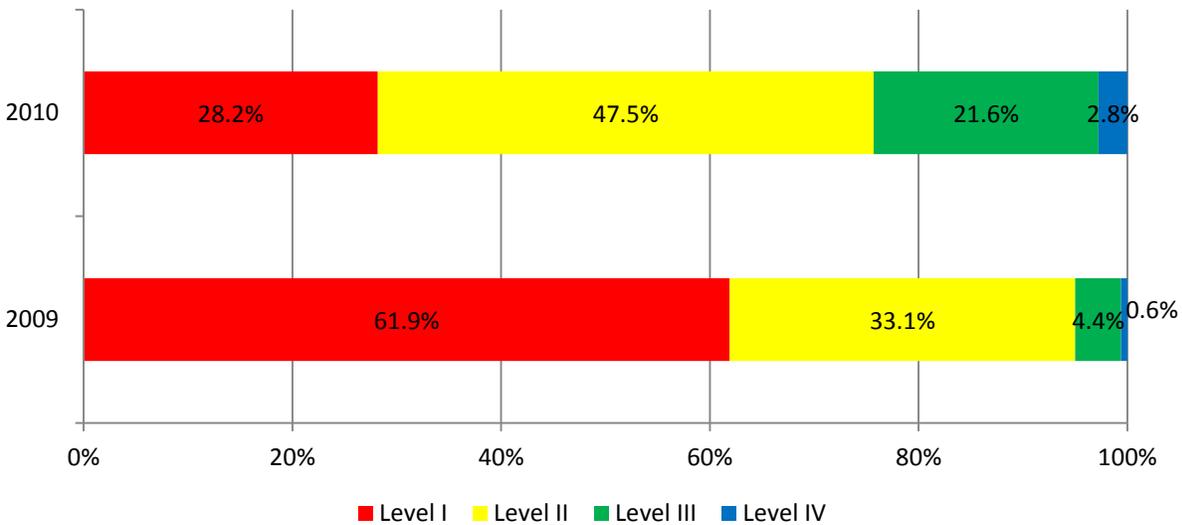
\*p < .05. \*\*p < .01

***Elementary School Students: North Carolina End-of-Grade Reading Comprehension Test***

Elementary school students in the **first year sample** demonstrated a pattern of growth similar to that of the overall first year sample on the NC EOG Reading Comprehension Test, with students moving from lower achievement levels to higher achievement levels (see Figure 4). The percentage of students who scored at or above grade level increased from 5% prior to HillRAP to 24.4% after one year of implementation. The percentage of students who scored at Level I decreased from 61.9% to 28.2% after one year of HillRAP.

Figure 4

*Elementary School Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for First Year Sample (n = 181)*



***Secondary School Students: Woodcock-Johnson III Tests of Achievement***

Similar to overall results, secondary school students in the **first year sample** and **two year longitudinal sample** made greater than expected growth on each WJ-III test (see Table 7). The range of change scores for the **first year sample** was 2.32 to 4.16 and all change scores were statistically significant. Also, similar to overall results, secondary students demonstrated the greatest growth on Word Attack (change = 4.16) and Passage Comprehension (change = 3.56) tests. In addition, secondary school student change scores were higher than those of the overall first year sample; however, with the exception of the Passage Comprehension test, secondary school student means were lower at pretest (Fall 2009) than those of the overall first year sample.

The range of change scores for the **two year longitudinal sample** was 2.27 to 7.57 and all change scores were statistically significant. Students demonstrated the greatest growth on Word Attack (change = 7.57) and Letter-Word Identification (change = 4.49) tests and the Spring 2011 mean for the Word Attack test was in the average range of the WJ-III (mean = 90.67). In addition, change scores were greater for Letter-Word Identification, Reading Fluency, and Word Attack tests for the two year longitudinal sample than those of the first year sample; thus, secondary students who received HillRAP for two years demonstrated greater growth on these

tests. Finally, secondary school students in the two year longitudinal sample demonstrated greater growth on Letter-Word Identification, Reading Fluency, and Word Attack tests compared to the overall two year longitudinal sample. However, secondary school students in the two year longitudinal sample had lower pretest means (Fall 2009) on all tests compared to the overall two year longitudinal sample.

Table 7

*Secondary School Student Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

Test	First Year Sample (n = 68) <sup>a</sup>			Two Year Longitudinal Sample (n = 51)			
	Fall 2009 Mean (SD)	Spring 2010 Mean (SD)	2009– 2010 Change	Fall 2009 Mean (SD)	Spring 2010 Mean (SD)	Spring 2011 Mean (SD)	2009– 2011 Change
Letter-Word Identification	82.68 (14.48)	85.00 (14.98)	2.32**	80.94 (12.79)	83.55 (13.61)	85.43 (14.68)	4.49**
Reading Fluency	84.04 (13.02)	87.16 (14.19)	3.12**	80.90 (11.32)	83.65 (11.96)	84.41 (11.95)	3.51**
Passage Comprehension	80.54 (13.83)	84.10 (13.51)	3.56**	78.65 (11.84)	82.27 (12.58)	80.92 (12.41)	2.27*
Word Attack	84.45 (11.58)	88.61 (9.90)	4.16**	83.10 (9.43)	88.16 (9.33)	90.67 (11.12)	7.57**

<sup>a</sup>n-size for First Year Sample is 67 for Reading Fluency and Word Attack tests

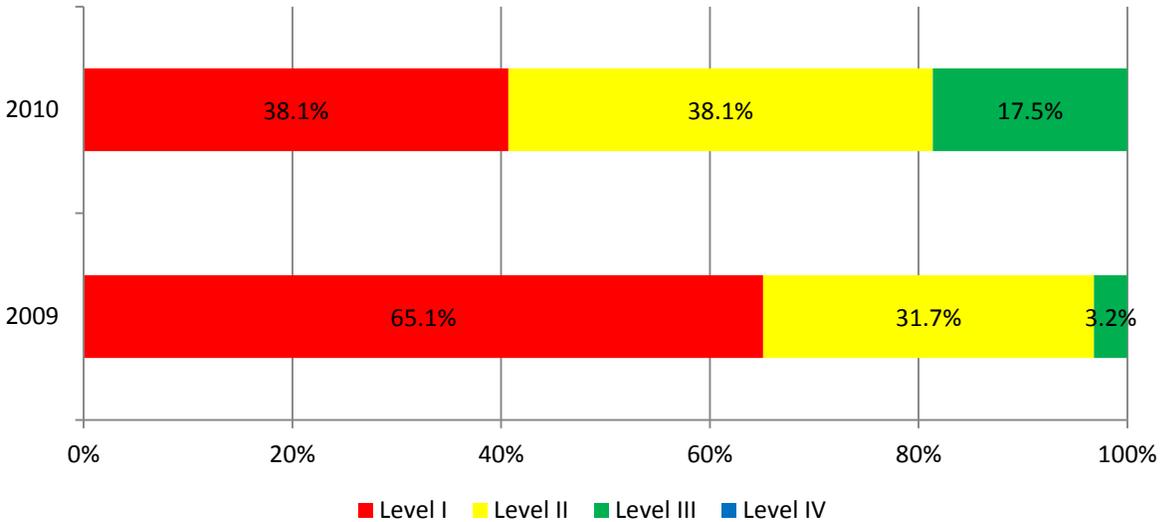
\*p < .05. \*\*p < .01

### ***Middle School Students: North Carolina End-of-Grade Reading Comprehension Test***

Middle school students in the **first year sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 5). The percentage of students who scored at grade level increased from 3.2% prior to HillRAP to 17.5% after one year of implementation. The percentage of students who scored at Level I decreased from 65.1% to 38.1% after one year of HillRAP. Unlike the overall first year sample, no middle school students were above grade level prior to or following one year of HillRAP.

Figure 5

*Middle School Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for First Year Sample (n = 63)*



### **Race and Ethnicity Results**

WJ-III age-referenced standard score and EOG Reading Comprehension Test results are presented in the following sections for the first year sample and the two year longitudinal sample disaggregated by race and ethnicity: White students, Black students, and Hispanic students. There were insufficient numbers of students from other racial and ethnic groups (e.g., American Indian students) to conduct disaggregated analysis.

#### ***White Students: Woodcock-Johnson III Tests of Achievement***

White students in the **first year sample** and **two year longitudinal sample** demonstrated a similar pattern of results to those of the overall sample. They made greater than expected growth on each WJ-III test (see Table 8). The range of change scores for the **first year sample** was 1.89 to 3.56 and all change scores were statistically significant. Students demonstrated the greatest growth on Reading Fluency (change = 3.56) and Passage Comprehension (change = 3.54) tests. In addition, the Spring 2010 mean for the Word Attack test was in the average range for WJ-III scores (mean = 91.83).

The range of change scores for the **two year longitudinal sample** was 2.85 to 5.34 and change scores for all tests were statistically significant. Similar to overall results, students demonstrated the greatest growth on Word Attack (change = 5.34) and Passage Comprehension (change = 4.44) tests and the Spring 2010 and Spring 2011 means for the Word Attack test were in the average range of the WJ-III (Fall 2009 mean = 90.22; Spring 2010 mean = 91.14). In addition, change scores were greater for Letter-Word Identification, Passage Comprehension, and Word Attack tests for the two year longitudinal sample than those of the first year sample; thus, White students who received HillRAP for two years demonstrated greater growth on these tests. Finally, White students in the two year longitudinal sample demonstrated greater growth on Letter-Word Identification and Passage Comprehension tests compared to the overall two year longitudinal sample.

Table 8

*White Student Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

Test	First Year Sample (n = 170) <sup>a</sup>			Two Year Longitudinal Sample (n = 90)			
	Fall 2009 Mean (SD)	Spring 2010 Mean (SD)	2009– 2010 Change	Fall 2009 Mean (SD)	Spring 2010 Mean (SD)	Spring 2011 Mean (SD)	2009– 2011 Change
Letter-Word Identification	86.65 (12.26)	88.54 (12.27)	1.89**	83.79 (11.96)	86.11 (11.86)	86.64 (12.30)	2.85**
Reading Fluency	84.07 (11.04)	87.63 (12.32)	3.56**	82.39 (10.91)	85.48 (12.11)	85.59 (11.85)	3.20**
Passage Comprehension	81.83 (11.16)	85.37 (11.70)	3.54**	79.38 (11.70)	83.06 (12.37)	83.82 (12.19)	4.44**
Word Attack	88.48 (10.37)	91.83 (9.58)	3.35**	85.80 (9.62)	90.22 (8.37)	91.14 (9.70)	5.34**

<sup>a</sup>n-size for First Year Sample is 169 for Reading Fluency and Word Attack tests

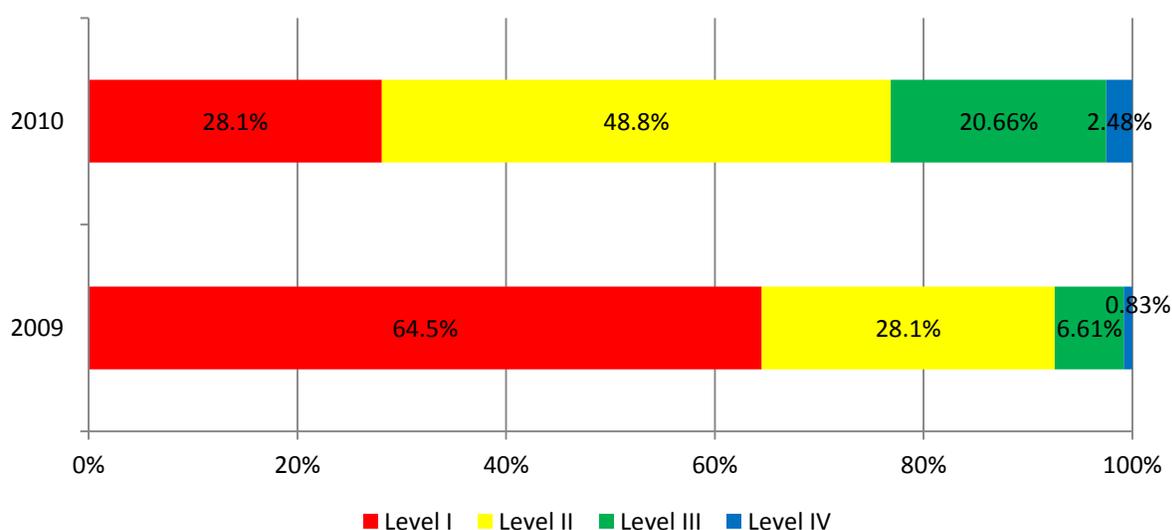
\*p <.05. \*\*p <.01

**White Students: North Carolina End-of-Grade Reading Comprehension Test**

White students in the **first year sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 6). The percentage of students who scored at or above grade level increased from 7.44% prior to HillRAP to 23.14% after one year of implementation. The percentage of students who scored at Level I decreased from 64.5% to 28.1% after one year of HillRAP.

Figure 6

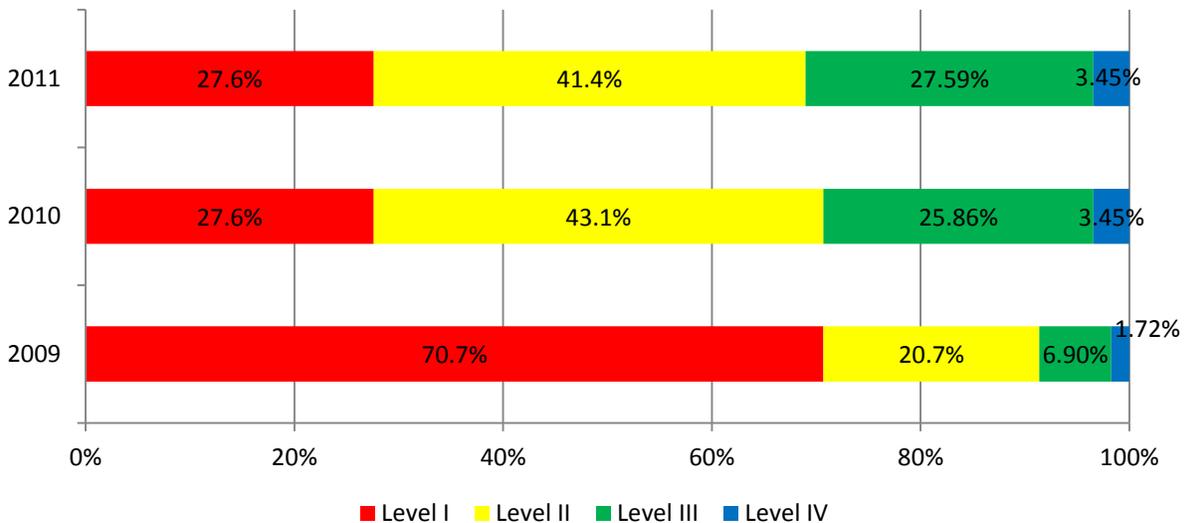
*White Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for First Year Sample (n = 121)*



Similarly, White students in the **two year longitudinal sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 7). The percentage of students who scored at or above grade level increased from 8.62% to 31.04% after two years of HillRAP. The percentage of students who scored at Level I decreased from 70.7 to 27.6% after two years of HillRAP. Thus, White students who received two years of HillRAP demonstrated greater movement from lower to higher achievement levels than White students who received one year of HillRAP instruction.

Figure 7

*White Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Two Year Longitudinal Sample (n = 58)*



***Black Students: Woodcock-Johnson III Tests of Achievement***

Similar to overall results, Black students in the **first year sample** and **two year longitudinal sample** made greater than expected growth on each WJ-III test (see Table 9). The range of change scores for the **first year sample** was .97 to 3.15 and, with the exception of the Letter-Word Identification test, change scores were statistically significant. Similar to overall results, Black students demonstrated the greatest growth on Passage Comprehension (change = 3.15) and Word Attack (change = 3.01) tests. In addition, Fall 2009 and Spring 2010 means for the Letter-Word Identification test were in the average range of the WJ-III (Fall 2009 mean = 90.10; Spring 2010 mean = 91.07), as was the Spring 2010 Word Attack test mean (mean = 92.97). Finally, Black student change scores were lower than those of the overall first year sample for all four tests; however, Black student Fall 2009 means (pretest) were higher across all tests. Thus, Black students had higher mean scores on the tests prior to participating in HillRAP.

The range of change scores for the **two year longitudinal sample** was .19 to 5.16. Change scores for Passage Comprehension and Word Attack tests were statistically significant with students demonstrating the greatest growth on the Word Attack test (change = 5.16). The Spring 2010 mean for the Letter-Word Identification test was in the average range of the WJ-III (mean =

90.24), as were the Spring 2010 and Spring 2011 means for the Word Attack test (Spring 2010 mean = 92.76; Spring 2011 mean = 94.83). In addition, change scores for Letter-Word Identification, Reading Fluency, and Passage Comprehension tests for the two year longitudinal sample were lower than those of the first year sample; the change score for the Word Attack test was higher. Finally, similar to the results of Black students in the first year sample, the change scores of Black students in the two year longitudinal sample were lower than those of the overall sample for all four tests; however, Black student Fall 2009 means (pretest) were higher across all tests. Thus, Black students had higher mean scores on the tests prior to participating in HillRAP.

Table 9

*Black Student Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

Test	First Year Sample (n = 99)			Two Year Longitudinal Sample (n = 42)			
	Fall 2009 Mean	Spring 2010 Mean	2009– 2010 Change	Fall 2009 Mean	Spring 2010 Mean	Spring 2011 Mean	2009–2011 Change
Letter-Word Identification	90.10 (11.11)	91.07 (11.17)	0.97	89.79 (12.17)	90.24 (13.18)	89.98 (13.47)	0.19
Reading Fluency	87.02 (10.80)	89.46 (10.99)	2.44**	87.26 (10.63)	89.40 (11.04)	89.29 (11.49)	2.03
Passage Comprehension	83.41 (9.97)	86.57 (9.48)	3.15**	82.60 (10.32)	86.48 (8.16)	84.98 (10.03)	2.38*
Word Attack	89.96 (9.24)	92.97 (9.26)	3.01**	89.67 (10.96)	92.76 (9.69)	94.83 (12.72)	5.16**

\*p < .05. \*\*p < .01

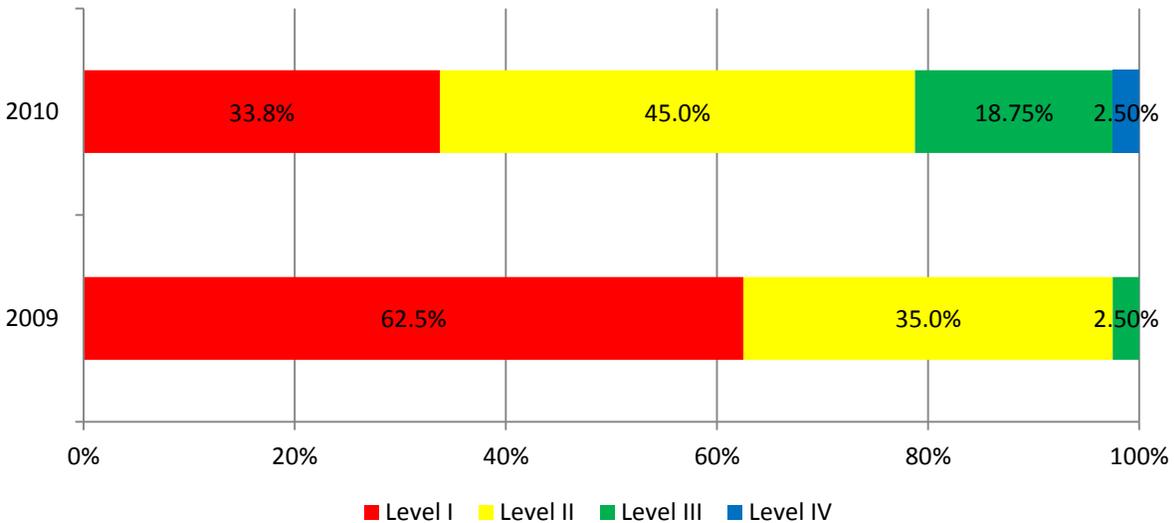
***Black Students: North Carolina End-of-Grade Reading Comprehension Test***

Similar to overall results, Black students in the **first year sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 8). The percentage of students who scored at grade level increased from 2.5% prior to HillRAP to 21.25% after one year of implementation. The percentage of students who scored at Level I decreased from 62.5% to 33.8% after one year of HillRAP. Unlike overall

results, there were no Black students in the first year sample above grade level in Spring 2009 (pre-HillRAP).

Figure 8

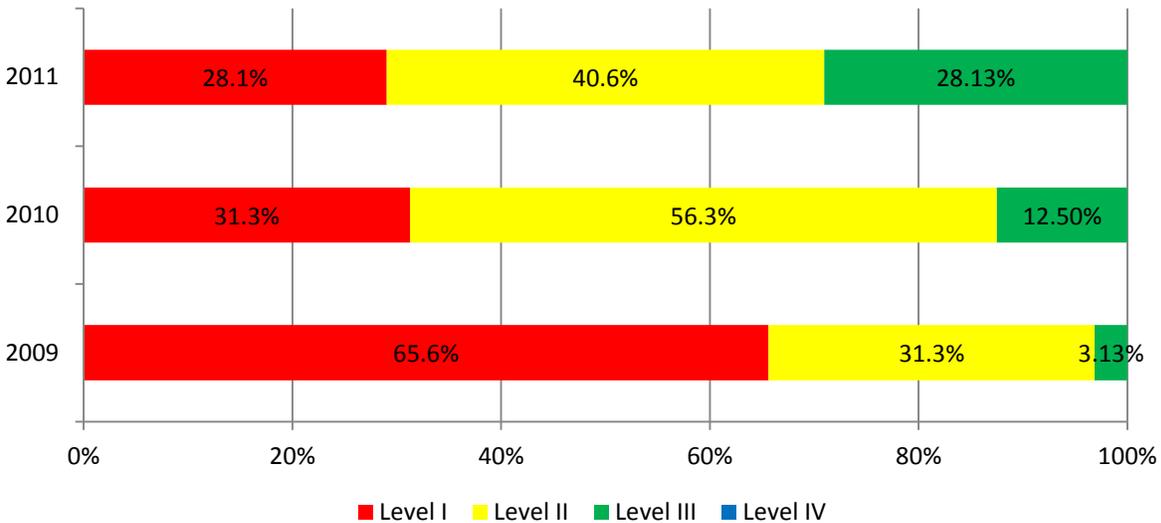
*Black Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for First Year Sample (n = 80)*



Additionally, Black students in the **two year longitudinal sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 9). The percentage of students who scored at grade level increased from 3.13% to 28.13% after two years of HillRAP. The percentage of students who scored at Level I decreased from 65.6% to 28.1% after two years of HillRAP. Therefore, Black students who received two years of HillRAP demonstrated greater movement from lower to higher achievement levels than Black students who received one year of HillRAP instruction. Finally, unlike overall results, there were no Black students in the two year longitudinal sample above grade level in Spring 2009 (pre-HillRAP), Spring 2010, or Spring 2011.

Figure 9

*Black Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Two Year Longitudinal Sample (n = 32)*



### *Hispanic Students: Woodcock-Johnson III Tests of Achievement*

WJ-III test results for Hispanic students showed a pattern similar to that of overall results.

Hispanic students in the **first year sample** and **two year longitudinal sample** made greater than expected growth on each WJ-III test (see Table 10). The range of change scores for the **first year sample** was 2.06 to 4.18 and, with the exception of the Passage Comprehension Test, change scores were statistically significant. Similar to overall results, Hispanic students demonstrated the greatest growth on the Word Attack test (change = 4.18) and the Spring 2010 mean for the Word Attack test was in the average range of the WJ-III (mean = 91.09). Unlike overall results, the Hispanic student change score for Passage Comprehension was the lowest of all four tests (change = 2.06). However, Hispanic student change scores were greater than those of the overall first year sample for Letter-Word Identification, Reading Fluency, and Word Attack.

The range of change scores for the **two year longitudinal sample** was 3.07 to 9.43. With the exception of the Letter-Word Identification test, all change scores were statistically significant and students demonstrated the greatest growth on the Word Attack (change = 9.43), Reading Fluency (change = 8.64), and Passage Comprehension (change = 8.00) tests. The Spring 2011 mean for the Word Attack test was in the average range of the WJ-III (mean = 94.43). Similarly,

change scores for Reading Fluency, Passage Comprehension, and Word Attack tests for Hispanic students in the two year longitudinal sample were greater than those of Hispanic students in the first year sample. Of particular interest are the change scores for the Passage Comprehension test. This was the lowest change score (change = 2.08) for Hispanic students in the first year sample, which was not the case for the two year longitudinal sample (change = 8.00). Further, all change scores of Hispanic students in the two year longitudinal sample were higher than those of students in the overall two year longitudinal sample. Thus, Hispanic students who participated in HillRAP for two years demonstrated greater gains on all tests than Hispanic students who participated for one year. They also demonstrated greater gains compared to the overall two year longitudinal sample.

Table 10

*Hispanic Student Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

Test	First Year Sample (n = 32)			Two Year Longitudinal Sample (n = 14)			
	Fall 2009 Mean	Spring 2010 Mean	2009– 2010 Change	Fall 2009 Mean	Spring 2010 Mean	Spring 2011 Mean	2009– 2011 Change
Letter-Word Identification	82.84 (16.37)	86.09 (15.29)	3.25**	81.43 (17.69)	84.36 (13.99)	84.50 (14.51)	3.07
Reading Fluency	80.66 (12.74)	84.38 (11.70)	3.72**	79.07 (12.74)	84.57 (11.43)	87.71 (11.13)	8.64**
Passage Comprehension	77.00 (14.19)	79.06 (14.96)	2.06	73.00 (14.30)	75.29 (12.43)	81.00 (10.27)	8.00**
Word Attack	86.91 (13.22)	91.09 (11.54)	4.18**	85.00 (13.93)	89.43 (10.11)	94.43 (8.25)	9.43**

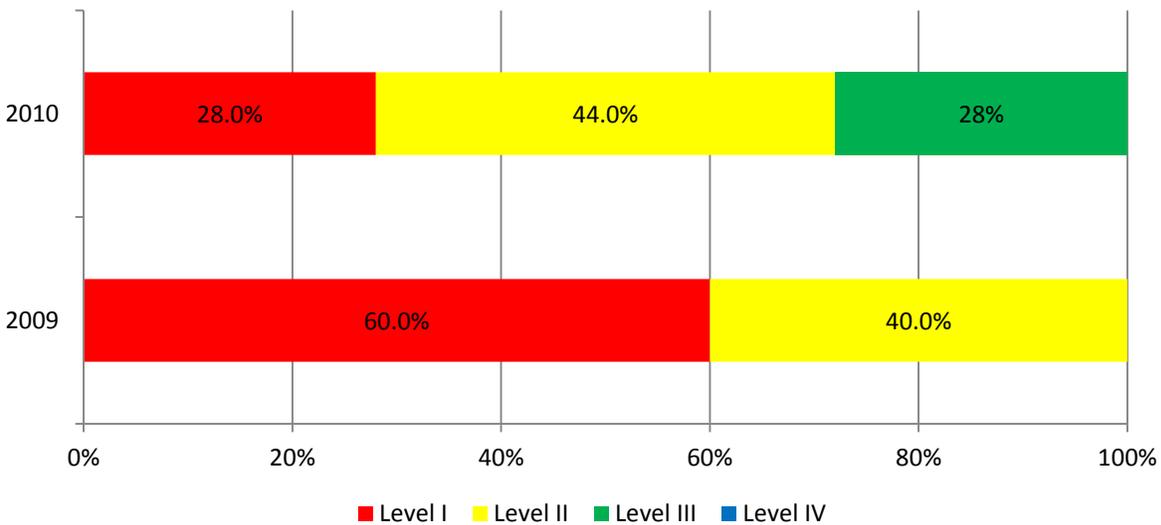
\*p < .05. \*\*p < .01

***Hispanic Students: North Carolina End-of-Grade Reading Comprehension Test***

Hispanic students in the **first year sample** demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension Test (see Figure 10). No students scored at grade level prior to HillRAP; 28% scored at grade level after one year of implementation. In addition, the percentage of students who scored at Level I decreased from 60% to 28% after one year of HillRAP. Unlike overall results, there were no Hispanic students in the first year sample at grade level in Spring 2009 (pre-HillRAP). There were too few Hispanic students with NC EOG Reading Comprehension Test scores for two year longitudinal analysis.

Figure 10

*Hispanic Student North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for First Year Sample (n = 25)*



**Results for Students Identified to Receive Exceptional Children’s Services**

WJ-III age-referenced standard score and EOG Reading Comprehension Test results are presented in the following sections for the first year sample and the two year longitudinal sample disaggregated by students identified to receive EC services, and further disaggregated by students identified as learning disabled.

### ***Students Identified to Receive EC Services: Woodcock-Johnson III Tests of Achievement***

As with the overall sample, students in the **first year sample** and **two year longitudinal sample** who were identified to receive EC services made greater than expected growth on each WJ-III test (see Table 11). The range of change scores for the **first year sample** was 1.83 to 3.94 and all change scores were statistically significant. Students demonstrated the greatest growth on Word Attack (change = 3.94) and Reading Fluency (change = 3.36) tests. In addition, students identified to receive EC services in the first year sample demonstrated greater growth on Letter-Word Identification, Reading Fluency, and Word Attack tests compared to the overall first year sample.

The range of change scores for the **two year longitudinal sample** was 1.93 to 5.74 and change scores for all tests were statistically significant. Similar to overall results, students demonstrated the greatest growth on Word Attack (change = 5.74) and Passage Comprehension (change = 3.79) tests. In addition, change scores were greater for Letter-Word Identification, Passage Comprehension, and Word Attack tests for the two year longitudinal sample than those of the first year sample; thus, students identified to receive EC services who received HillRAP for two years demonstrated greater growth on these tests. Finally, students identified to receive EC services in the two year longitudinal sample demonstrated greater growth on Letter-Word Identification and Word Attack tests compared to the overall two year longitudinal sample.

### ***Students Identified to Receive EC Services: North Carolina End-of-Grade Reading Comprehension Test***

Students in the **first year sample** who were identified to receive EC services demonstrated a pattern of growth similar to that of the overall first year sample on the NC EOG Reading Comprehension Test, with students moving from lower achievement levels to higher achievement levels (see Figure 11). The percentage of students who scored at or above grade level increased from 9.08% prior to HillRAP to 18.18% after one year of implementation. The percentage of students who scored at Level I decreased from 62.3% to 39% after one year of HillRAP.

Table 11

*Students Identified to Receive EC Services Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

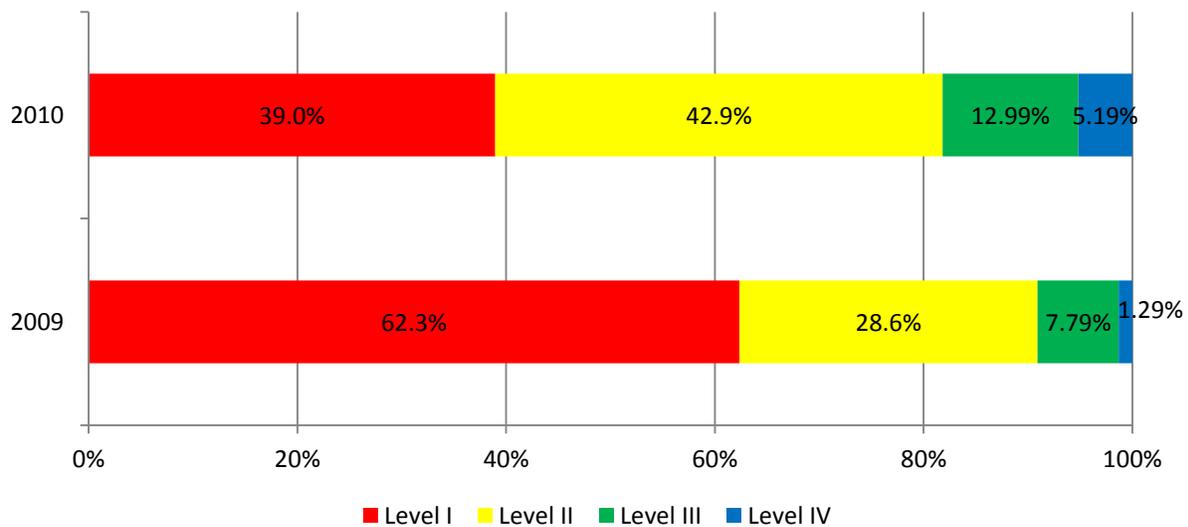
Test	First Year Sample (n = 109) <sup>a</sup>			Two Year Longitudinal Sample (n = 68)			
	Fall 2009 Mean	Spring 2010 Mean	2009– 2010 Change	Fall 2009 Mean	Spring 2010 Mean	Spring 2011 Mean	2009– 2011 Change
Letter-Word Identification	82.21 (12.68)	84.04 (12.33)	1.83**	80.79 (13.30)	82.51 (12.46)	82.72 (13.57)	1.93*
Reading Fluency	79.16 (11.06)	82.52 (11.46)	3.36**	78.93 (11.12)	82.09 (12.19)	81.97 (11.82)	3.04**
Passage Comprehension	76.17 (12.18)	79.28 (12.54)	3.10**	74.84 (13.24)	78.22 (12.46)	78.63 (12.70)	3.79**
Word Attack	84.96 (10.35)	88.90 (9.46)	3.94**	83.91 (10.71)	88.37 (8.77)	89.65 (11.39)	5.74**

<sup>a</sup>n-size for First Year Sample is 108 for Reading Fluency and Word Attack

\*p < .05. \*\*p < .01

Figure 11

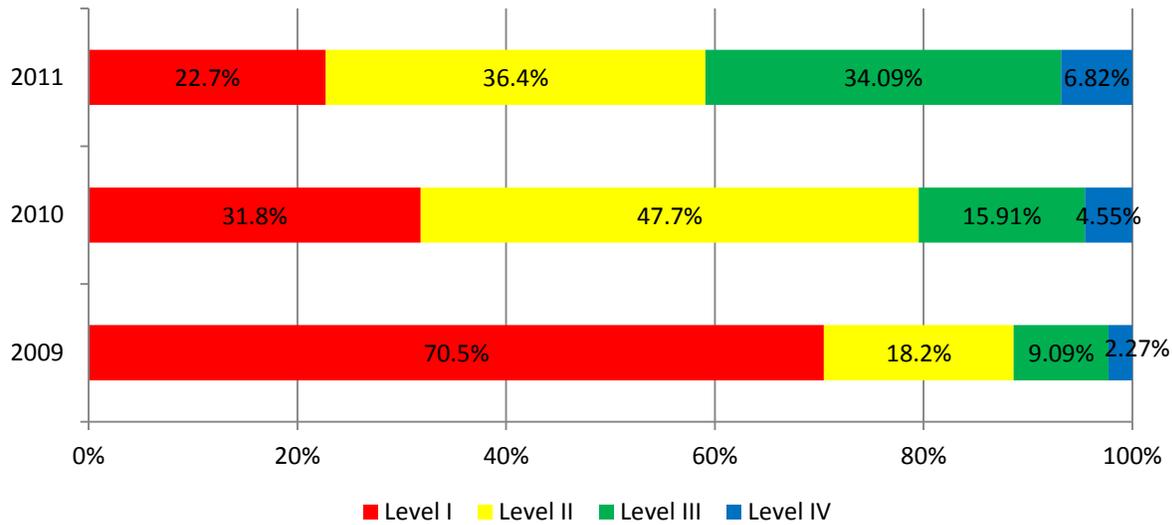
*Students Identified to Receive EC Services North Carolina End-of-Grade Reading Comprehension Tests Achievement Levels for First Year Sample (n = 77)*



Students in the **two year longitudinal sample** who were identified to receive EC services also demonstrated growth from lower achievement levels to higher achievement levels on the NC EOG Reading Comprehension test (see Figure 12). The percentage of students who scored at or above grade level increased from 11.36% to 40.91% after two years of HillRAP. The percentage of students who scored at Level I decreased from 70.5% to 22.7% after two years of HillRAP. Thus, students who received two years of HillRAP demonstrated greater movement from lower to higher achievement levels than those who received one year.

Figure 12

*Students Identified to Receive EC Services North Carolina End-of-Grade Reading Comprehension Test Achievement Levels for Two Year Longitudinal Sample (n = 44)*



***Learning Disabled Students: Woodcock-Johnson III Tests of Achievement***

Of the students identified to receive EC services, 40 in the first year sample and 24 in the two year longitudinal sample were identified as learning disabled. Learning disabled students in the **first year sample** and **two year longitudinal sample** made greater than expected growth on each WJ-III test (see Table 12). The range of change scores for the **first year sample** was 2.02 to 4.98. Students demonstrated the greatest growth on Word Attack (change = 4.98) and Reading Fluency (change = 3.20) tests; the change scores for these two tests were also statistically significant.

The range of change scores for the **two year longitudinal sample** was 1.25 to 5.04. Similar to results for learning disabled students in the first year sample, students demonstrated the greatest growth on Word Attack (change = 5.04) and Reading Fluency (change = 4.26) tests; the change score for the Word Attack test was statistically significant. In addition, change scores were greater for Reading Fluency, Passage Comprehension, and Word Attack tests for the two year longitudinal sample compared to those of the first year sample; thus, learning disabled students who received HillRAP for two years demonstrated greater growth on these tests. There was an insufficient number of learning disabled students with NC EOG Reading Comprehension Test data to conduct analysis.

Table 12

*Learning Disabled Student Means, Standard Deviations (SD), and Change Scores for First Year Sample and Two Year Longitudinal Sample Age-Referenced Standard Scores on Woodcock Johnson Tests of Achievement III Reading Tests*

Test	First Year Sample (n = 40) <sup>a</sup>			Two Year Longitudinal Sample (n = 24)			
	Fall 2009 Mean	Spring 2010 Mean	2009– 2010 Change	Fall 2009 Mean	Spring 2010 Mean	Spring 2011 Mean	2009– 2011 Change
Letter-Word Identification	77.23 (13.93)	79.25 (13.15)	2.02	75.21 (14.18)	76.71 (10.56)	76.46 (9.54)	1.25
Reading Fluency	76.88 (10.40)	80.08 (11.62)	3.20*	77.62 (11.63)	80.58 (13.96)	81.88 (12.88)	4.26
Passage Comprehension	74.65 (12.82)	77.03 (12.96)	2.38	74.42 (15.05)	76.71 (13.97)	78.08 (12.65)	3.66
Word Attack	80.46 (12.29)	85.44 (9.81)	4.98**	78.58 (12.48)	85.08 (7.87)	83.62 (8.54)	5.04**

<sup>a</sup>n-size for First Year Sample is 39 for Word Attack test

\*p < .05. \*\*p < .01

**2. How many sessions of HillRAP instruction did students receive? Is there a relationship between the number of HillRAP sessions students receive and achievement in reading?**

Descriptive results addressing the first part of research question two appear in Table 13 below. The standard deviations and ranges indicate notable variability in the number of sessions attended by HillRAP students. Variability was greater for the two year longitudinal sample than the first year sample (first year sample SD = 17.50, range = 86; two year longitudinal sample SD = 34.90, range = 150). In addition, correlation analysis was conducted to determine if there was a relationship between the number of HillRAP sessions students received and reading achievement, but no correlation was evidenced. It should be noted that correlation analysis is a different type of analysis than the pretest-posttest analysis presented earlier that showed a pattern of students demonstrating greater growth after two years of HillRAP.

Table 13  
*HillRAP Attendance for Study Samples*

Sample	n-size	Mean	Standard Deviation	Range of Sessions
First Year Sample	325	111.60	17.50	66-152
Two Year Longitudinal Sample	164	212.60	34.90	135-285

**3. Do teachers who receive HillRAP training effectively implement HillRAP in a public school setting?**

Results based on analysis of HillRAP Teacher Observation Form “Overall Teaching Proficiency” ratings appear in Table 14 below, organized by each of five observations. Overall, all teacher ratings were above 2 on a 3-point scale. In addition, mean teacher ratings increased with each observation and standard deviations (i.e., variability in ratings) decreased. Thus, “Overall Teaching Proficiency” improved over time; however, based on the results of correlation analysis, no relationship between teacher proficiency ratings and student achievement in reading were evidenced. The lack of relationship is potentially a result of restriction of range—i.e., the 3-point scale doesn’t allow for much variability in teacher ratings and in this study the range was further restricted by the generally high ratings received by HillRAP teachers.

Table 14

*HillRAP Teacher Overall Teaching Proficiency Ratings Means and Standard Deviations*

2009-2011	Observation 1 (n = 46)	Observation 2 (n = 46)	Observation 3 (n = 46)	Observation 4 (n = 44)	Observation 5 (n = 44)
Mean	2.37	2.70	2.80	2.95	2.98
Standard Deviation	.53	.47	.45	.21	.15

**FINDINGS AND RECOMMENDATIONS**

Overall, students who received HillRAP instruction improved academic achievement in reading. Across years and student groups, HillRAP students demonstrated greater than expected growth for average ability students their age on all WJ-III reading tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. They similarly demonstrated growth on the NC EOG Reading Comprehension Test, moving from lower to higher achievement levels. Further, a pattern of students demonstrating greater growth after two years of HillRAP instruction compared to one year was found. The following are specific findings:

- Students decreased and sometimes closed the gap between their achievement and the average range for WJ-III scores. Students most frequently moved into the average range for the Word Attack test.
- Students who received HillRAP instruction for two years demonstrated greater growth than those who received it for one year on all WJ-III reading tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. These students also demonstrated greater movement from lower to higher NC EOG Reading Comprehension Test achievement levels than students who received one year of HillRAP instruction.
- Secondary school students in the first year sample demonstrated greater growth compared to the overall sample on all WJ-III reading tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. However, with the exception

of the Passage Comprehension test, they scored lower at pretest than students in the overall sample.

- Secondary school students in the two year longitudinal sample demonstrated greater growth compared to the overall sample on three of the four WJ-III reading tests administered: Letter-Word Identification, Reading Fluency, and Word Attack. However, they scored lower at pretest than students in the overall sample on all four tests.
- No middle school student in the first year sample scored above grade level prior to or following one year of HillRAP instruction. Two year longitudinal analysis was not conducted due to students moving from elementary to middle to high school in year two of the evaluation study.
- White students in the two year longitudinal sample demonstrated greater growth compared to the overall two year longitudinal sample on two of the four WJ-III tests administered: Letter-Word Identification and Passage Comprehension.
- Black students in the first year sample and two year longitudinal sample experienced lower growth compared to the overall first year sample and two year longitudinal sample on all WJ-III tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack. However, they scored higher at pretest than students in the overall sample on all four tests.
- Black students in the first year sample and two year longitudinal sample demonstrated greater movement from lower to higher NC EOG Reading Comprehension Test achievement levels compared to the overall first year sample and two year longitudinal sample.
- Hispanic students in the first year sample demonstrated greater growth compared to the overall first year sample on three of the four WJ-III tests administered: Letter-Word Identification, Reading Fluency, and Word Attack.
- Hispanic students in the two year longitudinal sample demonstrated greater growth compared to the overall two year longitudinal sample on all of the four WJ-III tests administered: Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack.
- Hispanic students in the two year longitudinal sample made notably greater growth after two years of HillRAP instruction.
- No Hispanic student in the first year sample scored at grade level prior to receiving HillRAP instruction; 28% of Hispanic students in the first year sample scored at grade level after one

year of HillRAP instruction. There were too few Hispanic students in the two year longitudinal sample to conduct analysis of NC EOG Reading Comprehension Test scores.

- Students identified to receive EC services in the first year sample demonstrated greater growth compared to the overall first year sample on three of the four WJ-III tests administered: Letter-Word Identification, Reading Fluency, and Word Attack.
- Students identified to receive EC services in the two year longitudinal sample demonstrated greater growth compared to the overall two year longitudinal sample on two of the four WJ-III tests administered: Letter-Word Identification and Word Attack.
- There was considerable variability in the number of HillRAP sessions students received. No relationship between HillRAP attendance and student reading achievement was found.
- HillRAP teachers' overall teaching proficiency ratings were high and improved over time. No relationship between ratings and student reading achievement was found.

### **Recommendations Related to Study Findings**

Based on the findings of the evaluation study, the following recommendations should be considered:

- A pattern of students demonstrating greater growth after two years of HillRAP instruction was evidenced; however, given study attrition and the smaller sample size for the two year longitudinal sample, future studies of HillRAP should include a larger sample from the beginning and efforts should be made to ensure that as many students as possible can remain in HillRAP for a second year. In addition, future studies should include an implementation period of more than two years to determine the impact of longer participation in the program.
- Although they generally started out with lower means at pretest compared to the overall sample, secondary school students in the evaluation study demonstrated notable growth in reading achievement. These results are promising; however, the small number of secondary school students in the study sample limited the analysis. Subsequent studies of HillRAP should include a larger number of secondary school students, middle and high school, to better determine the impact of the program on these students.
- A contradiction was evidenced for Black students in the evaluation study. Although they started out with higher means at pretest on the WJ-III tests compared to the overall sample,

they started out at lower NC EOG Reading Comprehension Test achievement levels compared to the overall sample. Subsequently, they demonstrated less growth on the WJ-III tests comparatively, but greater growth on the NC EOG Reading Comprehension Test comparatively. Future studies of HillRAP should include larger numbers of Black students to determine if this is an accurate representation and to better determine program impacts for this group of students.

- Hispanic students in the evaluation study demonstrated greater growth in reading achievement compared to the overall sample; this growth was notably higher for Hispanic students who received two years of HillRAP. These results are promising; however, the low number of Hispanic students in the study sample limited the analysis for this group. Subsequent studies of HillRAP should include a larger number of Hispanic students to better determine the impact of the program on this student group.

### **Recommendations Related to Study Limitations**

Based on limitations of the evaluation study, the following recommendations should be considered:

- A major limitation of the evaluation study was the lack of a comparison group. Similar to other studies of HillRAP (Christopoulos, Rosanbalm, & Rabiner, 2011a; Christopoulos, Rosanbalm, & Rabiner, 2011b; Downing et al., 2007), quasi-experimental single group pretest-posttest design was used, increasing threats to the internal validity of study results—i.e., the degree to which results can be attributed to HillRAP. Although a historical cohort comparison group component was part of the design for the current study, issues with sample selection and available data precluded its inclusion in the evaluation. Thus, future studies of HillRAP should employ a comparison group design with a large sample to better determine the effectiveness of the program.
- The designs used for this and other HillRAP studies have been quantitative. Future studies of HillRAP should incorporate qualitative methods to gain deeper understanding of the program as it is implemented in public school settings.
- UNCW used data that were collected for purposes other than the evaluation study. HillRAP student attendance was documented by HillRAP teachers; HillRAP teacher observations and

proficiency ratings were conducted by Hill Center Master Teachers/Trainers for formative assessment and HillRAP certification. For future studies, evaluators should make sure data collection instruments and methods align with the needs of the study to the extent possible.

- Finally, although the evaluation study had limitations, it contributes to a growing body of support for HillRAP as an effective program for improving the reading achievement of struggling readers. Results of this study are consistent with those of previous studies of HillRAP (Christopolous, Rosanbalm, & Rabiner, 2011a; Christopolous, Rosanbalm, & Rabiner, 2011b; Downing, Williams, & Holden, 2009; Downing, Williams, Lasater, & Bell, 2007). This replication increases the external validity of results—i.e., the extent to which study results apply to other people and settings. Replication studies of HillRAP should be continued across diverse school settings and populations.

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## Appendix A

### *Hill Reading Achievement Program Student Selection Checklist*

**Program Description:** HillRAP is an individualized approach to teaching the five essential components of reading: Phonological Awareness, Phonics, Fluency, Vocabulary, and Comprehension. Sessions are 30-45 minutes long and include a 4:1 student to teacher ratio. Mastery learning, multi-sensory strategies, and continuous assessment are key components to HillRAP.

**Directions:** Respond to each of the items, providing comments when necessary. Teams should use this document to guide decision-making. In the case where a student is recommended for HillRAP, the form must be submitted to Katherine Mabe [[mabe@bcswan.net](mailto:mabe@bcswan.net)], Brunswick County Schools Project Coordinator.

School:	Teacher:
Student Name:	Student Grade Level:
Selection Team Members:	

**Recommended Selection Criteria:** *The following criteria should be met by each student for participation in HillRAP.*

<b>Meets Recommended Criteria</b>		
<input type="checkbox"/> YES	<input type="checkbox"/> NO	1. Not proficient on Summative Assessment (i.e. EOG reading test) <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	2. One year or more below grade level in reading <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	3. Ability to engage in instruction for a 30-45-minute duration <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	4. Not demonstrating sufficient growth based on data (indicate multiple data sources)

		<input type="checkbox"/> EVAAS <input type="checkbox"/> K-2 Literacy Assessment <input type="checkbox"/> DIBELS <input type="checkbox"/> _____ <input type="checkbox"/> _____ <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	5. Socio-emotional difficulties would not impact the student's ability to benefit from the program <u>Comments:</u>

**Additional Selection Criteria:** *The student may/may not meet the following criteria. These items are to be used to guide decision-making.*

<b>Meets Criteria</b>		
<input type="checkbox"/> YES	<input type="checkbox"/> NO	6. Has identified exceptionality <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	7. Has been retained <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	8. Is a student whose primary language is not English <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	9. Attendance history would not impact the student's ability to participate fully in the program <u>Comments:</u>
<input type="checkbox"/> YES	<input type="checkbox"/> NO	10. Other criteria used—Identify: <u>Comments:</u>

**Overall Assessment and Selection**

11. Student demonstrates need for and potential to benefit from intensive reading intervention and is being selected to participate in the Hill Reading Achievement Program.

YES     NO

<u>Comments:</u>    
----------------------------------

**Appendix B**  
**Participating Schools 2009-2010 and 2010-2011**

Year	Elementary	Secondary
2009-2010	Belville Elementary	Cedar Grove Middle <sup>b</sup>
	Bolivia Elementary	Leland Middle
	Jessie Mae Monroe Elementary	Shallotte Middle
	Lincoln Elementary	South Brunswick Middle
	Southport Elementary	
	Supply Elementary	
	Town Creek Elementary	
	Union Elementary	
	Virginia Williamson Elementary	
Waccamaw <sup>a</sup>		
2010-2011	Belville Elementary	Brunswick County Academy
	Bolivia Elementary	Leland Middle
	Jessie Mae Monroe Elementary	North Brunswick High
	Lincoln Elementary	Shallotte Middle
	Southport Elementary	South Brunswick High
	Supply Elementary	South Brunswick Middle
	Town Creek Elementary	West Brunswick High
	Union Elementary	
	Virginia Williamson Elementary	
Waccamaw		

<sup>a</sup> Waccamaw School is a K-8 school.

<sup>b</sup> Cedar Grove Middle School did not continue HillRAP in 2010-2011 due to the loss of their HillRAP teacher who moved to another school in the district.