

Research Abstract: Does Singing Improve Reading?
Using an Interactive Singing Program with Struggling Readers in Grades 4 and 5:
A comparison study of reading progress
Elementary Pilot Study Report (2005 – 2006)

Marie Biggs, MS
Susan Homan, Ph.D.
Robert Dedrick, Ph.D.

Introduction

This is the second abstract in a series reporting on the continuing research using an interactive singing software program with struggling readers. The *Initial Pilot Study* reported the results from a middle school population (2004 – 2005). This *Elementary Pilot Study* reports on the results from the initial elementary level study (2005 – 2006).

Both studies used software that teaches users to sing in tune and in rhythm while providing real-time pitch-tracking. Results from both studies consistently find struggling readers using the treatment intervention demonstrate gains in instructional reading level of more than 1 grade level following nine weeks of implementation. Control students experience no gains during the same 9-week period. Copies of research reports can be found at this USF College of Education link: www.coedu.usf.edu/main/departments/ce/Homan.html.

This abstract reports the results of an elementary school implementation using the software program, SingingCoach Version 2.0 (Electronic Learning Products, Inc., 5401 Hangar Court, Tampa, Florida, www.elpcorp.com). SingingCoach was originally developed to improve the singing of children and adults. It was used in this study to determine its effect on the word recognition, comprehension and reading fluency of struggling elementary school readers.

Overall Study Methodology

The 2005-2006 study targeted 4th and 5th grade students from two Hillsborough County elementary schools as part of a larger 6 site, 3 district study. The evaluation was completed in two phases. Phase 1 included a total of 231 students, of which 63 were elementary school students. All sites in this phase utilized a treatment/control pre/post design. All students participating in the study had been identified as struggling readers based on failing the reading portion of the Florida Comprehensive Assessment Test (FCAT). Students in the control and treatment groups were matched by grade level, reading teacher, FCAT reading level, gender, and SES (as evidenced by free and reduced lunch).

Phase II involved a smaller population (n=61). Ten of the students were at 1 elementary site. They were part of the control group during the initial 9-week study. These students were assessed 3 times: at the beginning and end of the 9-week study (Phase 1) and for a third time after completing 6 weeks of the SingingCoach intervention.

Elementary School Study Methodology

During Phase I of the study at the elementary level, the treatment students used the singing software three times per week for nine weeks. The software was used during their regularly scheduled language arts block as a literacy center in a computer lab setting. The control students received reading instruction within their language arts classroom. They also worked at literacy centers, just not the singing software center. Both groups received the same amount of reading remediation time.

The second phase of the 2005-2006 study for the elementary level was completed in May of 2006. Instead of a treatment control design, only one group was studied. This small sample (n=10) was comprised of struggling readers that were in the control group during the Phase I study.

Students were again assessed in the areas of word recognition, comprehension, fluency and instructional reading level. However, these students only used the singing software for 6 weeks. They did use it three times a week for 30 minutes in the same situation as the Phase I students.

Phase I: Treatment/Control

Pre/Post Assessment

Pretests and posttests were administered to all 63 elementary control and treatment students. The assessment used was the Qualitative Reading Inventory (QRI), an informal reading inventory, with passages ranging from 1st to 12th grade levels. The reliability, validity, and readability levels of all passages have been investigated and are reported in the QRI technical development section of the inventory (Leslie & Caldwell, 2000). The researchers administered all assessments. Both control and treatment students were assessed twice, at the beginning and end of the 9-week study period. The QRI provided information on each student in the areas of word recognition, comprehension, fluency and instructional reading level.

Results After 9-week Study

The study investigated the use of an interactive singing software program for elementary students in grades 4 and 5 in two elementary schools and their matched counterparts who did not use the program. In Phase I the researchers were interested in the difference in instructional reading levels, comprehension, word recognition and fluency between the control students (those who did not use the software) and the treatment students (those who used the singing software).

Table # 1 presents mean instructional levels measured by the QRI for the treatment and control groups prior to the use of the program (pretest) and nine weeks after using the program (posttest).

Table # 1: Mean Instructional Levels Pre/Post for Treatment and Control Students

Group	Pretest Means	Posttest Means	Difference
Control (n = 31) 16-4th grade students 15-5th grade students	1.61	1.53	(0.08)
Treatment (n = 32) 17-4 th grade students 15-5 th grade students	1.36	2.81	1.45

The levels of 1.36 and 1.61 at the time of the pretest indicate that both control and treatment group students were reading at a mid to low first grade level. The difference between 1.36 and 1.61 is not significant, but does indicate that the control students were reading at a slightly higher level than the treatment students before the intervention.

The treatment group exhibited means change from 1.36 at pretest to 2.81 at posttest showing an increase in reading scores of 1.45, or one year and 4 months, from low first to high second grade level; whereas, the control group went down slightly across the two points in time, 1.61 at pretest and 1.53 at the posttest a difference of -.08 in the reading scores. While the drop for control students from 1.61 to 1.53, is not significant, it does indicate that the students remained at a first grade reading level.

The effect size at the interaction is large at $f=1.05$, indicating a very meaningful significant difference in instructional reading levels between the control and treatment group at the time of the posttest.

Figure #1: Instructional Reading Levels

Hillsborough Elementary School Results
(two elementary schools)

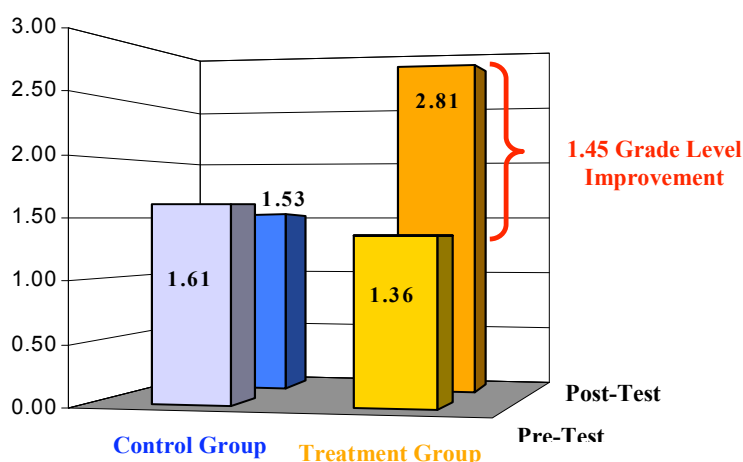
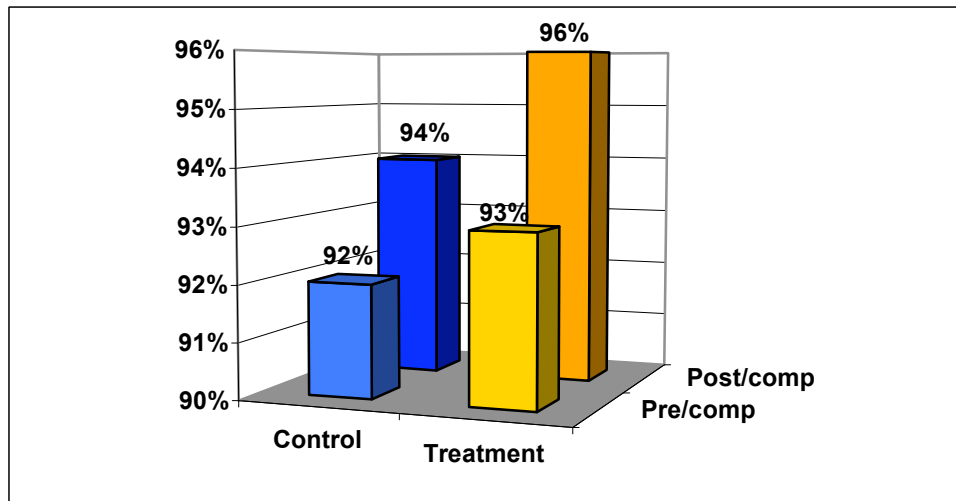


Figure 1 graphically displays the differences in pre and posttest scores for the control and treatment groups.

Word Recognition and Comprehension

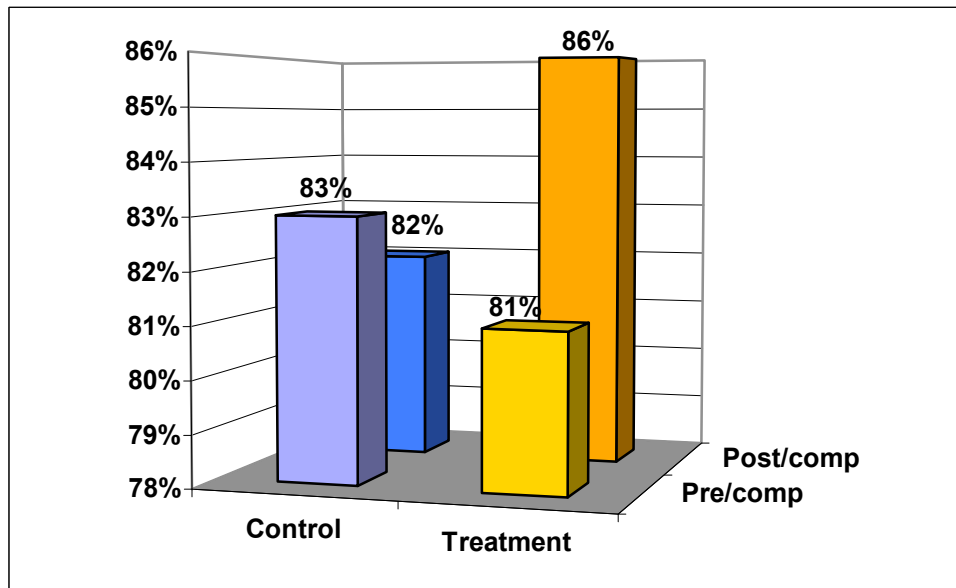
Word recognition and comprehension was also of interest over time and between groups of the 4th and 5th grade students. Figures #2 and 3 present the comparison of pre and posttest word recognition and comprehension scores. The word recognition scores are based on the percentage of words read correctly at instructional level. Ideally, as students grow in instructional level they will maintain high word recognition levels. The comprehension scores appearing in Figure #3 are based on the percentage of comprehension questions answered correctly at each student's instructional level. Again, the goal is to have comprehension remain at a high level complimenting instructional level growth. Even with an increase from a mid-first grade to a high-2nd grade instructional reading level, the treatment group increased their word recognition and comprehension scores. The control students had no growth in instructional level and had no improvement in their word recognition or comprehension scores.

Figure #2: Word Recognition Mean Scores Between Groups Across Time



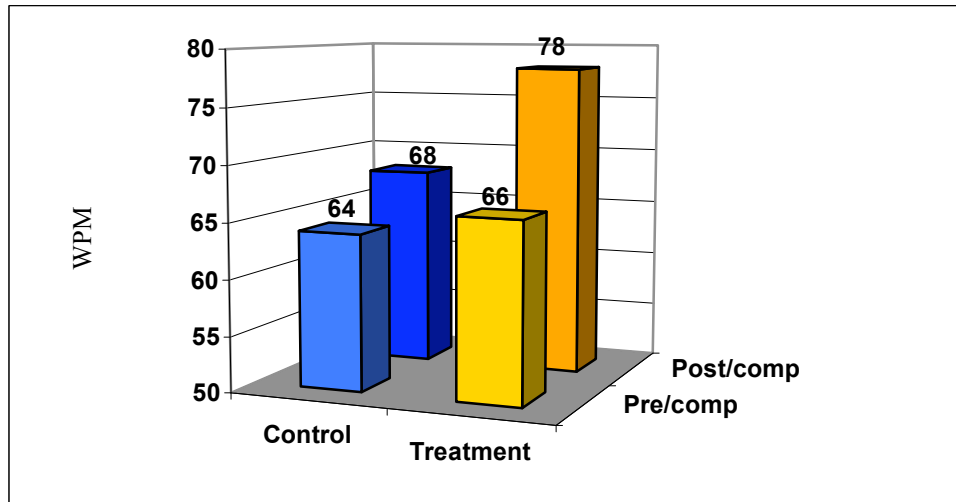
Noteworthy: Treatment students reading at a higher posttest instructional reading level were still able to improve their word recognition and comprehension levels.

Figure # 3: Comprehension Mean Scores Between Groups Across Time



Results revealed a statistically significant Group by Time interaction, $F(1, 31) = 5.26, p < .0290$ for the treatment group in Elementary School 1.

Figure # 4: Fluency Mean Words Per Minute Between Groups Across Time



Noteworthy: Treatment students also improved their fluency while reading at a higher posttest instructional reading level.

The Control students realized a smaller gain at the original lower instructional reading level.

Table # 4: Fluency

	<u>Instructional Reading Level</u>		<u>Fluency</u>	
	Pretest	Posttest	Pretest	Posttest
Control (n=10)	1.7	1.7	64 wpm	68 wpm
Treatment (n=10)	1.2	2.9	66 wpm	78 wpm

* The reading levels in table #5 represent the mean instructional level scores of the 20 students randomly for fluency assessment.

Phase 2: Control Group Turned Treatment

Phase 2 investigated the change in instructional reading level, word recognition, comprehension and fluency for students who were previously participants in the control group and then became members of a new treatment group. Also, of interest was the impact of change in duration from a 9-week intervention to a 6-week intervention. Using Phase 1 study pretest and posttest scores and then a follow-up posttest score after the 6-week intervention the instructional reading level increased by 1.4 years as noted in Figure #6.

Figure # 5: Control Group Turned Treatment - Instructional Reading Levels

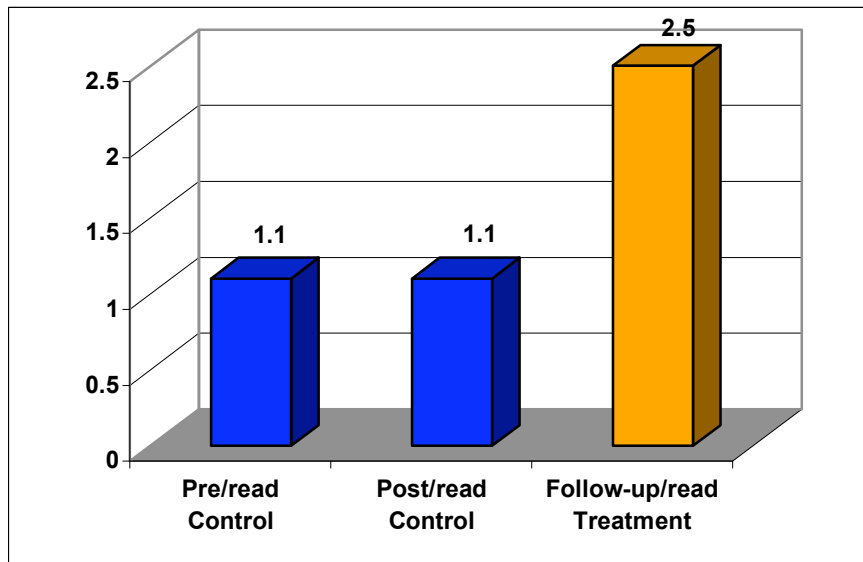


Table # 5: Control Group Turned Treatment - Instructional Reading Levels

Group	Control Group Pretest Mean	Control Group Posttest Mean	Treatment Group Posttest Mean
Treatment (n = 10)	1.1	1.1	2.5

Figure # 6: Control Turned Treatment – Word Recognition

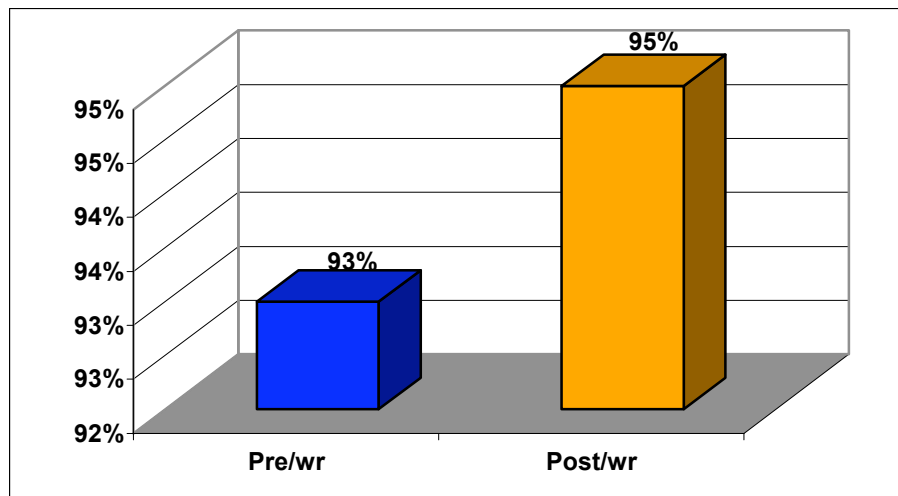
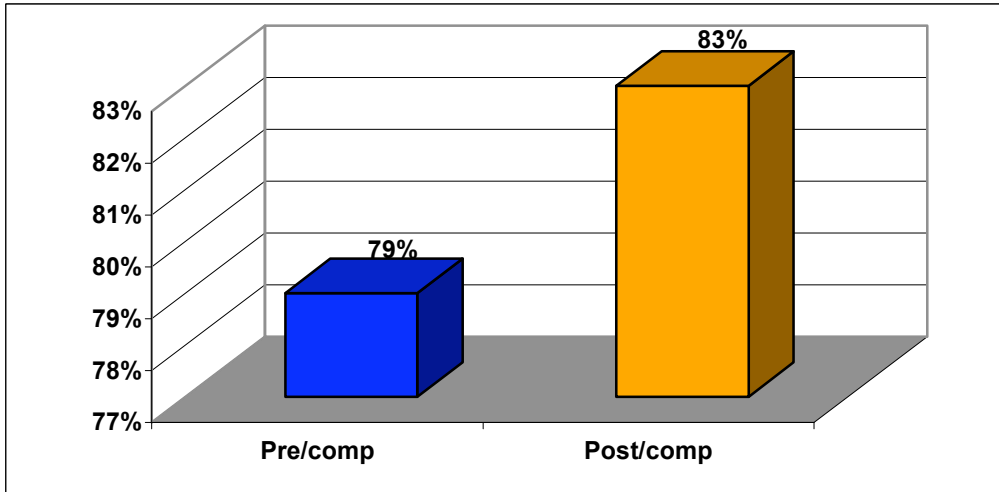


Table # 6: Control Group Turned Treatment – Word Recognition

	Pre-Comprehension		Post-Comprehension	
	Mean	%	Mean	%
Treatment (n = 10)	1.1	93%	2.5	95%

Figure # 7: Control Turned Treatment - Comprehension



Also, fluency was measured over three points in time: beginning of Phase 1; 9 weeks later at the end of Phase 1; and 6 weeks later at the end of Phase 2.

Figure # 8: Control Turned Treatment – Fluency

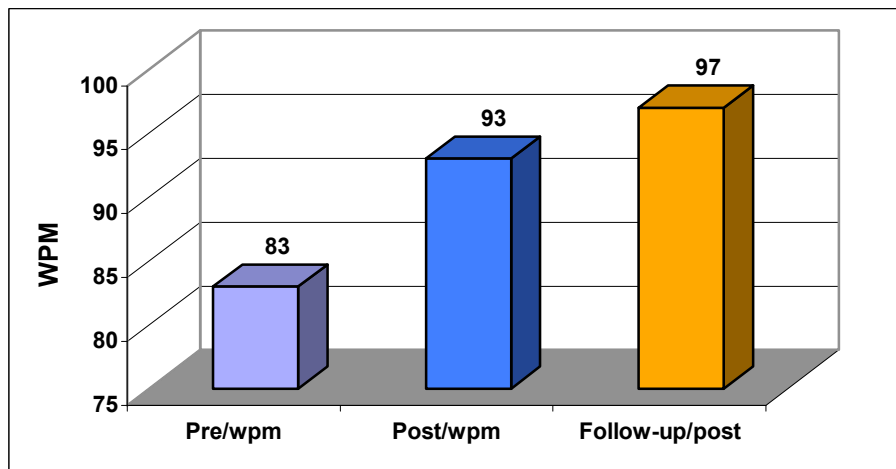


Table # 8: Control Group Turned Treatment – Fluency

Group	Pre- Comprehension		Post-Comprehension		Follow-up Post	
	Mean	WPM	Mean	WPM	Mean	WPM
Treatment (n = 10)	1.1	83	1.1	93	2.5	97

Discussion of Findings

These findings provide consistent evidence to support the use of an interactive singing software program that provides real time pitch tracking to increase instructional reading levels for elementary struggling readers. The research conducted over two years and in three school districts with struggling readers at elementary, middle and high school levels has produced the same results in each study. Students using the singing software make significant gains in reading after only 6 to 9 weeks of use.

The researchers believe several components of the program provided the impetus for student improvement in reading. The program provides for repetition, which improves fluency and comprehension. It also provides for continuous self-assessment, supporting confirmation and guidance (Samuels, 1979; Guthrie & Wigfield, 2000). The ability of each student to receive instant feedback through the real time pitch tracking mechanism provides for a measure of autonomy and self-regulation. As supported in the literature (NRP, 2000, Sample, 2005), the music/singing itself was motivating and engaging for the all age groups.

Future Research

The technology used in SingingCoach has been developed further and a new program, Tune In to Reading, was designed specifically for classroom use. The next study, supported by the FLDOE, will investigate the use of Tune in to Reading with Limited English Proficiency students at the elementary level. This opportunity should provide better information about the relationship between struggling readers' use of Tune in to Reading and FCAT scores. In addition, the researchers are in discussions with Dr. John Gabrieli of MIT, to study patterns and areas of brain activity associated with reading improvement for struggling readers.

Implications for the Classroom

The use of singing combined with technology appears to be strongly supported as an integral component of reading classrooms. Using computers and singing programs can support the literacy growth of students because: (a) students are motivated by singing, (b) students will work to be autonomous, and (c) alternative texts provide variety and depth to the reading experience and leads to greater levels of reading achievement.

In summary, the use of an interactive singing software program with real-time pitch-tracking as an alternative text provided autonomous support, real-world experiences, and opportunities for the struggling readers to exhibit sophisticated reading techniques. As an intervention for struggling readers, this software program successfully advanced reading in the areas of comprehension, vocabulary, and fluency. The instructional techniques employed by the students' use of the software program combined guided oral and silent reading of leveled songs, and repeated readings for automaticity and singing for reading prosody. This combination consistently helped students make significant gains in reading achievement.

References:

Electronic Learning Products, Inc. (2004). SingingCoach Learn to Sing Program. Tampa, Florida.

Guthrie, J.T. & Wigfield, A. (2000). Engagement and motivation in reading. In M. Kamil, P.B. Monsental, P.D. Pearson & R. Barr (Eds.) *Handbook of Reading Research Volume III* (pp. 403-422).

Leslie, Lauren & Caldwell, JoAnne. (2000). *Qualitative Reading Inventory-III*. Allyn & Bacon. Boston, MA.

National Reading Panel Report (NRP). (2000). NICHD. US Department of Education. Washington, DC.

Sample, K.J. (2005). Promoting fluency in adolescents with reading difficulties. *Interventions in Schools and Clinics*, 40 (4). 243-246.

Samuels, S.J. (1979). The method of repeated readings. *The Reading Teacher*. 41, 756-760.

For more information about the study results or software, please contact:

Marie Biggs, MS
Susan Homan, Ph.D.
Electronic Learning Products, Inc.

mariecbiggs@aol.com
homan@tempest.coedu.usf.edu
www.elpcorp.com
info@elpcorp.com